SEQUENCE LISTING

<110> Sherman, David H.
      Liu, Hung-Wen
      Xue, Yongquan
      Zhao, Lishan
      Regents of the University of Minnesota, et al.

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gggcttcacc gccttccggc ccagccctct gatcgcgggg ctcggcacgc cgggcggcgg     12660
ccgggcggcg gagacccccg aggaggggaa cgccaccgct gcggcggacc tcaccgccct     12720
gccgcccgcc gaactccgca ccgcgctgcg cgagctggtg cgagcccgga ccgccgcggc     12780
gctcggcctc gacgacccgg ccgaggtcgc cgagggcgaa cggttccccg ccatgggctt     12840
cgactccctg gccaccgtac ggctgcgccg cggactcgcc tcggccacgg cctcgacct     12900
gccccccgat ctgctcttcg accgggacac cccggccgcg ctcgccgccc acctggccga     12960
actgctcgcc accgcacggg accacggacc cggcggcccc gggaccggtg ccgcgccggc     13020
cgatgccgga agcggcctgc cggccctcta ccgggaggcc gtccgcaccg ccgggccgc      13080
ggaaatggcc gaactgctcg ccgccgcttc ccggttccgc cccgccttcg ggacggcgga     13140
ccggcagccg gtggccctcg tgccgctggc cgacggcgcg gaggacaccg ggctcccgct     13200
gctcgtgggc tgcgccggga cggcggtggc ctccggcccg gtggagttca ccgccttcgc     13260
cggagcgctg gcggacctcc cggcggcggc cccgatggcc gcgctgccgc agcccggctt     13320
tctgccggga gaacgagtcc cggccacccc ggaggcattg ttcgaggccc aggcggaagc     13380
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                                    4

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gctgctgcgc tacgcggccg gccggccctt cgtgctgctg gggcactccg ccggcgccaa    13440
catgggcccac gccctgaccc gtcatctgga ggcgaacggt ggcggccccg cagggctggt    13500
gctcatggac atctacaccc ccgccgaccc cggcgcgatg ggcgtctggc ggaacgacat    13560
gttccagtgg gtctggcggc gctcggacat cccccccggac gaccaccgcc tcacggccat    13620
gggcgcctac caccggctgc ttctcgactg gtcgcccacc cccgtccgcg ccccccgtact    13680
gcatctgcgc ccgcgggaac ccatgggcga ctggccaccc ggggacaccg gctggcagtc    13740
ccactgggac ggcgcgcaca ccaccgccgg catccccgga aaccacttca cgatgatgac    13800
cgaacacgcc tccgccgccg cccggctcgt gcacggctgg ctcgcggaac ggaccccgtc    13860
cgggcagggc gggtcaccgt cccgcgcggc ggggagagag gagaggccgt gaacacggca    13920
gccggcccga ccggcaccgc cgccggcggc accaccgccc cggcggcggc acacgacctg    13980
tcccgcgccg gacgcaggct ccaactcacc cgggccgcac agtggttcgc cggcaaccag    14040
ggagacccct acgggatgat cctgcgcgcc ggcaccgccg acccggcacc gtacgaggaa    14100
gagatccccg ggtaccgagc tcgaattctt aattaaggag gtcgtagatg agtaacaaga    14160
acaacgatga gctgcagcgg caggcctcgg aaaacaccct ggggctgaac ccggtcatcg    14220
gtatccgccg caaagacctg ttgagctcgg cacgcaccgt gctgcgccag gccgtgcgcc    14280
aaccgctgca cagcgccaag catgtggccc actttggcct ggagctgaag aacgtgctgc    14340
tgggcaagtc cagccttgcc ccggaaagcg acgaccgtcg cttcaatgac ccggcatgga    14400
gcaacaaccc actttaccgc cgctacctgc aaacctatct ggcctggcgc aaggagctgc    14460
aggactggat cggcaacagc gacctgtcgc cccaggacat cagccgcggc cagttcgtca    14520
tcaacctgat gaccgaagcc atggctccga ccaacaccct gtccaacccg gcagcagtca    14580
aacgcttctt cgaaaccggc ggcaagagcc tgctcgatgg cctgtccaac ctggccaagg    14640
acctggtcaa caacggtggc atgcccagcc aggtgaacat ggacgccttc gaggtgggca    14700
agaacctggg caccagtgaa ggcgccgtgg tgtaccgcaa cgatgtgctg gagctgatcc    14760
agtacaagcc catcaccgag caggtgcatg cccgcccgct gctggtggtg ccgccgcaga    14820
tcaacaagtt ctacgtattc gacctgagcc cggaaaagag cctggcacgc tactgcctgc    14880
gctcgcagca gcagaccttc atcatcagct ggcgcaaccc gaccaaagcc cagcgcgaat    14940
ggggcctgtc cacctacatc gacgcgctca aggaggcggt cgacgcggtg ctggcgatta    15000
ccggcagcaa ggacctgaac atgctcggtg cctgctccgg cggcatcacc tgcacggcat    15060
tggtcggcca ctatgccgcc ctcggcgaaa acaaggtcaa tgccctgacc ctgctggtca    15120
gcgtgctgga caccaccatg gacaaccagg tcgccctgtt cgtcgacgag cagactttgg    15180
aggccgccaa gcgccactcc taccaggccg gtgtgctcga aggcagcgag atggccaagg    15240
tgttcgcctg gatgcgcccc aacgacctga tctggaacta ctgggtcaac aactacctgc    15300
tcggcaacga gccgccggtg ttcgacatcc tgttctggaa caacgacacc acgcgcctgc    15360
cggccgcctt ccacggcgac ctgatcgaaa tgttcaagag caacccgctg acccgcccgg    15420
acgccctgga ggtttgcggc actccgatcg acctgaaaca ggtcaaatgc gacatctaca    15480
gccttgccgg caccaacgac cacatcaccc cgtggcagtc atgctaccgc tcggcgcacc    15540
tgttcggcgg caagatcgag ttcgtgctgt ccaacagcgg ccacatccag agcatcctca    15600
acccgccagg caaccccaag gcgcgcttca tgaccggtgc cgatcgcccg ggtgacccgg    15660
tggcctggca ggaaaacgcc accaagcatg ccgactcctg gtggctgcac tggcaaagct    15720
ggctgggcga gcgtgccggc gagctggaaa aggcgccgac ccgcctgggc aaccgtgcct    15780
atgccgctgg cgaggcatcc ccgggcacct acgttcacga gcgttgagct gcagcgccgt    15840
ggccacctgc gggacgccac ggtgttgaat tc                                  15872
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Met Asn Glu Ala Ile Ala Val Val Gly Met Ser Cys Arg Leu Pro Lys
1               5                   10                  15
Ala Ser Asn Pro Ala Ala Phe Trp Glu Leu Leu Arg Asn Gly Glu Ser
            20                  25                  30
Ala Val Thr Asp Val Pro Ser Gly Arg Trp Thr Ser Val Leu Gly Gly
        35                  40                  45
Ala Asp Ala Glu Glu Pro Ala Glu Ser Gly Val Arg Arg Gly Gly Phe
    50                  55                  60
Leu Asp Ser Leu Asp Leu Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro
65                  70                  75                  80
```

5

Arg Glu Ala Ala Ala Met Asp Pro Gln Gln Arg Leu Val Leu Glu Leu
                    85   90   95
Ala Trp Glu Ala Leu Glu Asp Ala Gly Ile Val Pro Gly Thr Leu Ala
                100   105   110
Gly Ser Arg Thr Ala Val Phe Val Gly Thr Leu Arg Asp Asp Tyr Thr
            115   120   125
Ser Leu Leu Tyr Gln His Gly Glu Gln Ala Ile Thr Gln His Thr Met
        130   135   140
Ala Gly Val Asn Arg Gly Val Ile Ala Asn Arg Val Ser Tyr His Leu
145   150   155   160
Gly Leu Gln Gly Pro Ser Leu Thr Val Asp Ala Ala Gln Ser Ser Ser
                165   170   175
Leu Val Ala Val His Leu Ala Cys Glu Ser Leu Arg Ala Gly Glu Ser
            180   185   190
Thr Thr Ala Leu Val Ala Gly Val Asn Leu Asn Ile Leu Ala Glu Ser
        195   200   205
Ala Val Thr Glu Glu Arg Phe Gly Gly Leu Ser Pro Asp Gly Thr Ala
        210   215   220
Tyr Thr Phe Asp Ala Arg Ala Asn Gly Phe Val Arg Gly Glu Gly Gly
225   230   235   240
Gly Val Val Val Leu Lys Pro Leu Ser Arg Ala Leu Ala Asp Gly Asp
                245   250   255
Arg Val His Gly Val Ile Arg Ala Ser Ala Val Asn Asn Asp Gly Ala
            260   265   270
Thr Pro Gly Leu Thr Val Pro Ser Arg Ala Ala Gln Glu Lys Val Leu
        275   280   285
Arg Glu Ala Tyr Arg Lys Ala Ala Leu Asp Pro Ser Ala Val Gln Tyr
        290   295   300
Val Glu Leu His Gly Thr Gly Thr Pro Val Gly Asp Pro Ile Glu Ala
305   310   315   320
Ala Ala Leu Gly Ala Val Leu Gly Ser Ala Arg Pro Ala Asp Glu Pro
                325   330   335
Leu Leu Val Gly Ser Ala Lys Thr Asn Val Gly His Leu Glu Gly Ala
                340   345   350
Ala Gly Ile Val Gly Leu Ile Lys Thr Leu Leu Ala Leu Gly Arg Arg
            355   360   365
Arg Ile Pro Ala Ser Leu Asn Phe Arg Thr Pro His Pro Asp Ile Pro
        370   375   380
Leu Asp Thr Leu Gly Leu Asp Val Pro Asp Gly Leu Arg Glu Trp Pro
385   390   395   400
His Pro Asp Arg Glu Leu Leu Ala Gly Val Ser Ser Phe Gly Met Gly
                405   410   415
Gly Thr Asn Ala His Val Val Leu Ser Glu Gly Pro Ala Gln Gly Gly
            420   425   430
Glu Gln Pro Gly Ile Asp Glu Glu Thr Pro Val Asp Ser Gly Ala Ala
        435   440   445
Leu Pro Phe Val Val Thr Gly Arg Gly Gly Glu Ala Leu Arg Ala Gln
        450   455   460
Ala Arg Arg Leu His Glu Ala Val Glu Ala Asp Pro Glu Leu Ala Pro
465   470   475   480
Ala Ala Leu Ala Arg Ser Leu Val Thr Thr Arg Thr Val Phe Thr His
                485   490   495
Arg Ser Val Val Leu Ala Pro Asp Arg Ala Arg Leu Leu Asp Gly Leu
                500   505   510
Gly Ala Leu Ala Ala Gly Thr Pro Ala Pro Gly Val Val Thr Gly Thr
            515   520   525
Pro Ala Pro Gly Arg Leu Ala Val Leu Phe Ser Gly Gln Gly Ala Gln
        530   535   540
Arg Thr Gly Met Gly Met Glu Leu Tyr Ala Ala His Pro Ala Phe Ala
545   550   555   560
Thr Ala Phe Asp Ala Val Ala Ala Glu Leu Asp Pro Leu Leu Asp Arg
                565   570   575

6

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Pro Leu Ala Glu Leu Val Ala Ala Gly Asp Thr Leu Asp Arg Thr Val
            580                 585                 590
His Thr Gln Pro Ala Leu Phe Ala Val Glu Val Ala Leu His Arg Leu
            595                 600                 605
Val Glu Ser Trp Gly Val Thr Pro Asp Leu Leu Ala Gly His Ser Val
            610                 615                 620
Gly Glu Ile Ser Ala Ala His Val Ala Gly Val Leu Ser Leu Arg Asp
625                 630                 635                 640
Ala Ala Arg Leu Val Ala Ala Arg Gly Arg Leu Met Gln Ala Leu Pro
                645                 650                 655
Glu Gly Gly Ala Met Val Ala Val Glu Ala Ser Glu Glu Glu Val Leu
                660                 665                 670
Pro His Leu Ala Gly Arg Glu Arg Glu Leu Ser Leu Ala Ala Val Asn
            675                 680                 685
Gly Pro Arg Ala Val Val Leu Ala Gly Ala Glu Arg Ala Val Leu Asp
            690                 695                 700
Val Ala Glu Leu Leu Arg Glu Gln Gly Arg Arg Thr Lys Arg Leu Ser
705                 710                 715                 720
Val Ser His Ala Phe His Ser Pro Leu Met Glu Pro Met Leu Asp Asp
                725                 730                 735
Phe Arg Arg Val Val Glu Glu Leu Asp Phe Gln Glu Pro Arg Val Asp
                740                 745                 750
Val Val Ser Thr Val Thr Gly Leu Pro Val Thr Ala Gly Gln Trp Thr
            755                 760                 765
Asp Pro Glu Tyr Trp Val Asp Gln Val Arg Arg Pro Val Arg Phe Leu
            770                 775                 780
Asp Ala Val Arg Thr Leu Glu Glu Ser Gly Ala Asp Thr Phe Leu Glu
785                 790                 795                 800
Leu Gly Pro Asp Gly Val Cys Ser Ala Met Ala Ala Asp Ser Val Arg
                805                 810                 815
Asp Gln Glu Ala Ala Thr Ala Val Ser Ala Leu Arg Lys Gly Arg Pro
            820                 825                 830
Glu Pro Gln Ser Leu Leu Ala Ala Leu Thr Thr Val Phe Val Arg Gly
            835                 840                 845
His Asp Val Asp Trp Thr Ala Ala His Gly Ser Thr Gly Thr Val Arg
            850                 855                 860
Val Pro Leu Pro Thr Tyr Ala Phe Gln Arg Glu Arg His Trp Phe Asp
865                 870                 875                 880
Gly Ala Ala Arg Thr Ala Ala Pro Leu Thr Ala Gly Arg Ser Gly Thr
                885                 890                 895
Gly Ala Gly Thr Gly Pro Ala Ala Gly Val Thr Ser Gly Glu Gly Glu
                900                 905                 910
Gly Glu Gly Glu Gly Ala Gly Ala Gly Gly Gly Asp Arg Pro Ala Arg
            915                 920                 925
His Glu Thr Thr Glu Arg Val Arg Ala His Val Ala Ala Val Leu Glu
            930                 935                 940
Tyr Asp Asp Pro Thr Arg Val Glu Leu Gly Leu Thr Phe Lys Glu Leu
945                 950                 955                 960
Gly Phe Asp Ser Leu Met Ser Val Glu Leu Arg Asn Ala Leu Val Asp
                965                 970                 975
Asp Thr Gly Leu Arg Leu Pro Ser Gly Leu Leu Phe Asp His Pro Thr
                980                 985                 990
Pro Arg Ala Leu Ala Ala His Leu Gly Asp Leu Leu Thr Gly Gly Ser
            995                 1000                1005
Gly Glu Thr Gly Ser Ala Asp Gly Ile Pro Pro Ala Thr Pro Ala Asp
            1010                1015                1020
Thr Thr Ala Glu Pro Ile Ala Ile Ile Gly Met Ala Cys Arg Tyr Pro
1025                1030                1035                1040
Gly Gly Val Thr Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Glu Gly
                1045                1050                1055
Arg Asp Ala Val Ser Gly Leu Pro Thr Asp Arg Gly Trp Asp Glu Asp
                1060                1065                1070
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7

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Leu Phe Asp Ala Asp Pro Asp Arg Ser Gly Lys Ser Ser Val Arg Glu
        1075                1080                1085
Gly Gly Phe Leu His Asp Ala Ala Leu Phe Asp Ala Gly Phe Phe Gly
    1090                1095                1100
Ile Ser Pro Arg Glu Ala Leu Gly Met Asp Pro Gln Gln Arg Leu Leu
1105                1110                1115                1120
Leu Glu Thr Ala Trp Glu Ala Val Glu Arg Ala Gly Leu Asp Pro Glu
                1125                1130                1135
Gly Leu Lys Gly Ser Arg Thr Ala Val Phe Val Gly Ala Thr Ala Leu
        1140                1145                1150
Asp Tyr Gly Pro Arg Met His Asp Gly Ala Glu Gly Val Glu Gly His
        1155                1160                1165
Leu Leu Thr Gly Thr Thr Pro Ser Val Met Ser Gly Arg Ile Ala Tyr
    1170                1175                1180
Gln Leu Gly Leu Thr Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser
1185                1190                1195                1200
Ser Ser Leu Val Ala Leu His Leu Ala Val Arg Ser Leu Arg Gln Gly
        1205                1210                1215
Glu Ser Ser Leu Ala Leu Ala Gly Gly Ala Thr Val Met Ser Thr Pro
        1220                1225                1230
Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Ala Asp Gly
    1235                1240                1245
Arg Ser Lys Ala Phe Ser Asp Ser Ala Asp Gly Thr Ser Trp Ala Glu
    1250                1255                1260
Gly Val Gly Leu Leu Val Val Glu Arg Leu Ser Asp Ala Glu Arg Asn
1265                1270                1275                1280
Gly His Pro Val Leu Ala Val Ile Arg Gly Ser Ala Val Asn Gln Asp
        1285                1290                1295
Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg
        1300                1305                1310
Val Ile Arg Gln Ala Leu Ala Asp Ala Gly Leu Thr Pro Ala Asp Val
        1315                1320                1325
Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile
    1330                1335                1340
Glu Ala Glu Ala Ile Leu Gly Thr Tyr Gly Arg Asp Arg Gly Glu Gly
1345                1350                1355                1360
Ala Pro Leu Gln Leu Gly Ser Leu Lys Ser Asn Ile Gly His Ala Gln
        1365                1370                1375
Ala Ala Ala Gly Val Gly Gly Leu Ile Lys Met Val Leu Ala Met Arg
        1380                1385                1390
His Gly Val Leu Pro Arg Thr Leu His Val Asp Arg Pro Thr Thr Arg
    1395                1400                1405
Val Asp Trp Glu Ala Gly Gly Val Glu Leu Leu Thr Glu Glu Arg Glu
    1410                1415                1420
Trp Pro Glu Thr Gly Arg Pro Arg Arg Ala Ala Ile Ser Ser Phe Gly
1425                1430                1435                1440
Ile Ser Gly Thr Asn Ala His Ile Val Val Glu Gln Ala Pro Glu Ala
        1445                1450                1455
Gly Glu Ala Ala Val Thr Thr Thr Ala Pro Glu Ala Gly Glu Ala Gly
        1460                1465                1470
Glu Ala Ala Asp Thr Thr Ala Thr Thr Pro Ala Ala Val Gly Val
    1475                1480                1485
Pro Glu Pro Val Arg Ala Pro Val Val Val Ser Ala Arg Asp Ala Ala
    1490                1495                1500
Ala Leu Arg Ala Gln Ala Val Arg Leu Arg Thr Phe Leu Asp Gly Arg
1505                1510                1515                1520
Pro Asp Val Thr Val Ala Asp Leu Gly Arg Ser Leu Ala Ala Arg Thr
        1525                1530                1535
Ala Phe Glu His Lys Ala Ala Leu Thr Thr Ala Thr Arg Asp Glu Leu
        1540                1545                1550
Leu Ala Gly Leu Asp Ala Leu Gly Arg Gly Glu Gln Ala Thr Gly Leu
        1555                1560                1565
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8

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Val Thr Gly Glu Pro Ala Arg Ala Gly Arg Thr Ala Phe Leu Phe Thr
    1570                1575                1580
Gly Gln Gly Ala Gln Arg Val Ala Met Gly Glu Glu Leu Arg Ala Ala
1585                1590                1595                1600
His Pro Val Phe Ala Ala Ala Leu Asp Thr Val Tyr Ala Ala Leu Asp
                1605                1610                1615
Arg His Leu Asp Arg Pro Leu Arg Glu Ile Val Ala Ala Gly Glu Glu
                1620                1625                1630
Leu Asp Leu Thr Ala Tyr Thr Gln Pro Ala Leu Phe Ala Phe Glu Val
            1635                1640                1645
Ala Leu Phe Arg Leu Leu Glu His His Gly Leu Val Pro Asp Leu Leu
    1650                1655                1660
Thr Gly His Ser Val Gly Glu Ile Ala Ala Ala His Val Ala Gly Val
1665                1670                1675                1680
Leu Ser Leu Asp Asp Ala Ala Arg Leu Val Thr Ala Arg Gly Arg Leu
                1685                1690                1695
Met Gln Ser Ala Arg Glu Gly Gly Ala Met Ile Ala Val Gln Ala Gly
            1700                1705                1710
Glu Ala Glu Val Val Glu Ser Leu Lys Gly Tyr Glu Gly Arg Val Ala
        1715                1720                1725
Val Ala Ala Val Asn Gly Pro Thr Ala Val Val Val Ser Gly Asp Ala
        1730                1735                1740
Asp Ala Ala Glu Glu Ile Arg Ala Val Trp Ala Gly Arg Gly Arg Arg
1745                1750                1755                1760
Thr Arg Arg Leu Arg Val Ser His Ala Phe His Ser Pro His Met Asp
                1765                1770                1775
Asp Val Leu Asp Glu Phe Leu Arg Val Ala Glu Gly Leu Thr Phe Glu
            1780                1785                1790
Glu Pro Arg Ile Pro Val Val Ser Thr Val Thr Gly Ala Leu Val Thr
        1795                1800                1805
Ser Gly Glu Leu Thr Ser Pro Ala Tyr Trp Val Asp Gln Ile Arg Arg
    1810                1815                1820
Pro Val Arg Phe Leu Asp Ala Val Arg Thr Leu Ala Ala Gln Asp Ala
1825                1830                1835                1840
Thr Val Leu Val Glu Ile Gly Pro Asp Ala Val Leu Thr Ala Leu Ala
            1845                1850                1855
Glu Glu Ala Leu Ala Pro Gly Thr Asp Ala Pro Asp Ala Arg Asp Val
        1860                1865                1870
Thr Val Val Pro Leu Leu Arg Ala Gly Arg Pro Glu Pro Glu Thr Leu
    1875                1880                1885
Ala Ala Gly Leu Ala Thr Ala His Val His Gly Ala Pro Leu Asp Arg
    1890                1895                1900
Ala Ser Phe Phe Pro Asp Gly Arg Arg Thr Asp Leu Pro Thr Tyr Ala
1905                1910                1915                1920
Phe Arg Arg Glu His Tyr Trp Leu Thr Pro Glu Ala Arg Thr Asp Ala
            1925                1930                1935
Arg Ala Leu Gly Phe Asp Pro Ala Arg His Pro Leu Leu Thr Thr Thr
            1940                1945                1950
Val Glu Val Ala Gly Gly Asp Gly Val Leu Leu Thr Gly Arg Leu Ser
    1955                1960                1965
Leu Thr Asp Gln Pro Trp Leu Ala Asp His Met Val Asn Gly Ala Val
    1970                1975                1980
Leu Leu Pro Ala Thr Ala Phe Leu Glu Leu Ala Leu Ala Ala Gly Asp
1985                1990                1995                2000
His Val Gly Ala Val Arg Val Glu Glu Leu Thr Leu Glu Ala Pro Leu
                2005                2010                2015
Val Leu Pro Glu Arg Gly Ala Val Arg Ile Gln Val Gly Val Ser Gly
            2020                2025                2030
Asp Gly Glu Ser Pro Ala Gly Arg Thr Phe Gly Val Tyr Ser Thr Pro
        2035                2040                2045
Asp Ser Gly Asp Thr Gly Asp Asp Ala Pro Arg Glu Trp Thr Arg His
    2050                2055                2060
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9

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Val Ser Gly Val Leu Gly Glu Gly Asp Pro Ala Thr Glu Ser Asp His
2065                2070                2075                2080
Pro Gly Thr Asp Gly Asp Gly Ser Ala Ala Trp Pro Pro Ala Ala Ala
            2085                2090                2095
Thr Ala Thr Pro Leu Asp Gly Val Tyr Asp Arg Leu Ala Glu Leu Gly
            2100                2105                2110
Tyr Gly Tyr Gly Pro Ala Phe Gln Gly Leu Thr Gly Leu Trp Arg Asp
            2115                2120                2125
Gly Ala Asp Thr Leu Ala Glu Ile Arg Leu Pro Ala Ala Gln His Glu
    2130                2135                2140
Ser Ala Gly Leu Phe Gly Val His Pro Ala Leu Leu Asp Ala Ala Leu
2145                2150                2155                2160
His Pro Ile Val Leu Glu Gly Asn Ser Ala Ala Gly Ala Cys Asp Ala
            2165                2170                2175
Asp Thr Asp Ala Thr Asp Arg Ile Arg Leu Pro Phe Ala Trp Ala Gly
            2180                2185                2190
Val Thr Leu His Ala Glu Gly Ala Thr Ala Leu Arg Val Arg Ile Thr
            2195                2200                2205
Pro Thr Gly Pro Asp Thr Val Thr Leu Arg Leu Thr Asp Thr Thr Gly
    2210                2215                2220
Ala Pro Val Ala Thr Val Glu Ser Leu Thr Leu Arg Ala Val Ala Lys
2225                2230                2235                2240
Asp Arg Leu Gly Thr Thr Ala Gly Arg Val Asp Asp Ala Leu Phe Thr
            2245                2250                2255
Val Val Trp Thr Glu Thr Gly Thr Pro Glu Pro Ala Gly Arg Gly Ala
            2260                2265                2270
Val Glu Val Glu Glu Leu Val Asp Leu Ala Gly Leu Gly Asp Leu Val
    2275                2280                2285
Glu Leu Gly Ala Ala Asp Val Val Leu Arg Ala Asp Arg Trp Thr Leu
    2290                2295                2300
Asp Gly Asp Pro Ser Ala Ala Ala Arg Thr Ala Val Arg Arg Thr Leu
2305                2310                2315                2320
Ala Ile Val Gln Glu Phe Leu Ser Glu Pro Arg Phe Asp Gly Ser Arg
            2325                2330                2335
Leu Val Cys Val Thr Arg Gly Ala Val Ala Ala Leu Pro Gly Glu Asp
            2340                2345                2350
Val Thr Ser Leu Ala Thr Gly Pro Leu Trp Gly Leu Val Arg Ser Ala
    2355                2360                2365
Gln Ser Glu Asn Pro Gly Arg Leu Phe Leu Leu Asp Leu Gly Glu Gly
    2370                2375                2380
Glu Gly Glu Arg Asp Gly Ala Glu Glu Leu Ile Arg Ala Ala Thr Ala
2385                2390                2395                2400
Gly Asp Glu Pro Gln Leu Ala Ala Arg Asp Gly Arg Leu Leu Ala Pro
            2405                2410                2415
Arg Leu Ala Arg Thr Ala Ala Leu Ser Ser Glu Asp Thr Ala Gly Gly
            2420                2425                2430
Ala Asp Arg Phe Gly Pro Asp Gly Thr Val Leu Val Thr Gly Gly Thr
            2435                2440                2445
Gly Gly Leu Gly Ala Leu Leu Ala Arg His Leu Val Glu Arg His Gly
    2450                2455                2460
Val Arg Arg Leu Leu Leu Val Ser Arg Arg Gly Ala Asp Ala Pro Gly
2465                2470                2475                2480
Ala Ala Asp Leu Gly Glu Asp Leu Ala Gly Leu Gly Ala Glu Val Ala
            2485                2490                2495
Phe Ala Ala Ala Asp Ala Ala Asp Arg Glu Ser Leu Ala Arg Ala Ile
            2500                2505                2510
Ala Thr Val Pro Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala
            2515                2520                2525
Gly Val Val Asp Asp Ala Thr Val Glu Ala Leu Thr Pro Glu Arg Leu
    2530                2535                2540
Asp Ala Val Leu Arg Pro Lys Val Asp Ala Ala Trp Asn Leu His Glu
2545                2550                2555                2560
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10

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Leu Thr Lys Asp Leu Arg Leu Asp Ala Phe Val Leu Phe Ser Ser Val
              2565                2570                2575
Ser Gly Ile Val Gly Thr Ala Gly Gln Ala Asn Tyr Ala Ala Ala Asn
              2580                2585                2590
Thr Gly Leu Asp Ala Leu Ala Ala His Arg Ala Ala Thr Gly Leu Ala
              2595                2600                2605
Ala Thr Ser Leu Ala Trp Gly Leu Trp Asp Gly Thr His Gly Met Gly
         2610                2615                2620
Gly Thr Leu Gly Ala Ala Asp Leu Ala Arg Trp Ser Arg Ala Gly Ile
2625                2630                2635              2640
Thr Pro Leu Thr Pro Leu Gln Gly Leu Ala Leu Phe Asp Ala Ala Val
              2645                2650                2655
Ala Arg Asp Asp Ala Leu Leu Val Pro Ala Gly Leu Arg Pro Thr Ala
              2660                2665                2670
His Arg Gly Thr Asp Gly Gln Pro Pro Ala Leu Trp Arg Gly Leu Val
         2675                2680                2685
Arg Ala Arg Pro Arg Arg Ala Ala Arg Thr Ala Ala Glu Ala Ala Asp
         2690                2695                2700
Thr Thr Gly Gly Trp Leu Ser Gly Leu Ala Ala Gln Ser Pro Glu Glu
2705                2710                2715                2720
Arg Arg Ser Thr Ala Val Thr Leu Val Thr Gly Val Val Ala Asp Val
              2725                2730                2735
Leu Gly His Ala Asp Ser Ala Ala Val Gly Ala Glu Arg Ser Phe Lys
         2740                2745                2750
Asp Leu Gly Phe Asp Ser Leu Ala Gly Val Glu Leu Arg Asn Arg Leu
         2755                2760                2765
Asn Ala Ala Thr Gly Leu Arg Leu Pro Ala Thr Thr Val Phe Asp His
    2770                2775                2780
Pro Ser Pro Ala Ala Leu Ala Ser His Leu Leu Ala Gln Val Pro Gly
2785                2790                2795                2800
Leu Lys Glu Gly Thr Ala Ala Thr Ala Thr Val Val Ala Glu Arg Gly
              2805                2810                2815
Ala Ser Phe Gly Asp Arg Ala Thr Asp Asp Asp Pro Ile Ala Ile Val
         2820                2825                2830
Gly Met Ala Cys Arg Tyr Pro Gly Gly Val Ser Ser Pro Glu Asp Leu
    2835                2840                2845
Trp Arg Leu Val Ala Glu Gly Thr Asp Ala Ile Ser Glu Phe Pro Val
    2850                2855                2860
Asn Arg Gly Trp Asp Leu Glu Ser Leu Tyr Asp Pro Asp Pro Glu Ser
2865                2870                2875                2880
Lys Gly Thr Thr Tyr Cys Arg Glu Gly Gly Phe Leu Glu Gly Ala Gly
         2885                2890                2895
Asp Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Val
         2900                2905                2910
Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Val Ser Trp Glu Ala Leu
    2915                2920                2925
Glu Arg Ala Gly Ile Asp Pro Ser Ser Leu Arg Gly Ser Arg Gly Gly
    2930                2935                2940
Val Tyr Val Gly Ala Ala His Gly Ser Tyr Ala Ser Asp Pro Arg Leu
2945                2950                2955                2960
Val Pro Glu Gly Ser Glu Gly Tyr Leu Leu Thr Gly Ser Ala Asp Ala
              2965                2970                2975
Val Met Ser Gly Arg Ile Ser Tyr Ala Leu Gly Leu Glu Gly Pro Ser
         2980                2985                2990
Met Thr Val Glu Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
         2995                3000                3005
Ala Val Arg Ala Leu Arg His Gly Glu Cys Gly Leu Ala Leu Ala Gly
    3010                3015                3020
Gly Val Ala Val Met Ala Asp Pro Ala Ala Phe Val Glu Phe Ser Arg
3025                3030                3035                3040
Gln Lys Gly Leu Ala Ala Asp Gly Arg Cys Lys Ala Phe Ser Ala Ala
              3045                3050                3055
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11

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Ala Asp Gly Thr Gly Trp Ala Glu Gly Val Gly Val Leu Val Leu Glu
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Arg Leu Ser Asp Ala Arg Arg Ala Gly His Thr Val Leu Gly Leu Val
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Thr Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala
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Pro Asn Gly Pro Ala Gln Gln Arg Val Ile Ala Glu Ala Leu Ala Asp
3105                3110                3115                3120
Ala Gly Leu Ser Pro Glu Asp Val Asp Ala Val Glu Ala His Gly Thr
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Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gly Ala Leu Leu Ala Ala
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Ser Gly Arg Asn Arg Ser Gly Asp His Pro Leu Trp Leu Gly Ser Leu
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Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ala Gly Val Gly Gly Val
     3170                3175                3180
Ile Lys Met Leu Gln Ala Leu Arg His Gly Leu Leu Pro Arg Thr Leu
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His Ala Asp Glu Pro Thr Pro His Ala Asp Trp Ser Ser Gly Arg Val
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Arg Leu Leu Thr Ser Glu Val Pro Trp Gln Arg Thr Gly Arg Pro Arg
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Arg Thr Gly Val Ser Ala Phe Gly Val Gly Gly Thr Asn Ala His Val
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Val Leu Glu Glu Ala Pro Ala Pro Pro Ala Pro Glu Pro Ala Gly Glu
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Trp Val Val Ser Gly Arg Asp Glu Pro Ala Leu Arg Ser Gln Ala Arg
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Arg Leu Arg Asp His Leu Ser Arg Thr Pro Gly Ala Arg Pro Arg Asp
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Ile Ala Phe Ser Leu Ala Ala Thr Arg Ala Ala Phe Asp His Arg Ala
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Val Leu Ile Gly Ser Asp Gly Ala Glu Leu Ala Ala Ala Leu Asp Ala
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Leu Ala Glu Gly Arg Asp Gly Pro Ala Val Val Arg Gly Val Arg Asp
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Ala Leu Asp Glu Val Thr Asp Arg Leu Asp Pro Leu Leu Gly Arg Pro
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Leu Gly His Ser Val Gly Glu Leu Ala Ala Ala His Val Ala Gly Val
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Leu Asp Leu Asp Asp Ala Cys Ala Leu Val Ala Ala Arg Gly Arg Leu
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Glu Ala Val Ala Glu Ala Ala Ala Gln Leu Ala Gly Arg Gly Arg Arg
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12

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Gly Met Leu Ala Gly Phe Arg Glu Val Ala Ala Gly Leu Arg Tyr Arg
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Glu Pro Glu Leu Thr Val Val Ser Thr Val Thr Gly Arg Pro Ala Arg
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Pro Gly Glu Leu Thr Gly Pro Asp Tyr Trp Val Ala Gln Val Arg Glu
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Pro Val Arg Phe Ala Asp Ala Val Arg Thr Ala His Arg Leu Gly Ala
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Glu Glu Cys Leu Glu Asp Asp Thr Val Ala Leu Leu Pro Ala Ile His
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Lys Pro Gly Thr Ala Pro His Gly Pro Ala Ala Pro Gly Ala Leu Arg
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Met His Ala Asp Gly Pro Glu Gly Pro Ala Arg Arg Val Glu Leu Pro
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Val His Ala Phe Arg His Arg Arg Tyr Trp Leu Ala Pro Gly Arg Ala
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Ala Asp Thr Asp Asp Trp Met Tyr Arg Ile Gly Trp Asp Arg Leu Pro
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Ala Val Thr Gly Gly Ala Arg Thr Ala Gly Arg Trp Leu Val Ile His
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Pro Asp Ser Pro Arg Cys Arg Glu Leu Ser Gly His Ala Glu Arg Ala
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Leu Arg Ala Ala Gly Ala Ser Pro Val Pro Leu Pro Val Asp Ala Pro
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Ala Ala Asp Arg Ala Ser Phe Ala Ala Leu Leu Arg Ser Ala Thr Gly
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Pro Asp Thr Arg Gly Asp Thr Ala Ala Pro Val Ala Gly Val Leu Ser
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Leu Leu Ser Glu Glu Asp Arg Pro His Arg Gln His Ala Pro Val Pro
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Ala Gly Val Leu Ala Thr Leu Ser Leu Met Gln Ala Met Glu Glu Glu
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Ala Val Glu Ala Arg Val Trp Cys Val Ser Arg Ala Ala Val Ala Ala
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Gly Arg Val Ala Ala Leu Glu Arg Pro Thr Arg Trp Gly Gly Leu Val
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Asp Leu Pro Ala Ser Pro Gly Ala Ala His Trp Ala Ala Ala Val Glu
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Trp Gly Arg Arg Leu Thr Arg Leu Pro Arg Asp Gly Gly Gly Arg Thr
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Ala Glu His Leu Ala Leu Thr Ser Arg Arg Gly Pro Asp Ala Pro Gly
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Ala Ala Gly Leu Glu Ala Glu Leu Leu Leu Gly Ala Lys Val Thr
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Phe Ala Ala Cys Asp Thr Ala Asp Arg Asp Gly Leu Ala Arg Val Leu
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Arg Ala Ile Pro Glu Asp Thr Pro Leu Thr Ala Val Phe His Ala Ala
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13

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Ser Gly Ala Gly Val Trp Gly Ser Ala Gly Gln Gly Ala Tyr Ala Ala
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Ala Asn Ala Ala Leu Asp Ala Leu Ala Arg Arg Arg Ala Ala Asp Gly
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Leu Pro Ala Thr Ser Ile Ala Trp Gly Val Trp Gly Gly Gly Gly Met
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Gly Ala Asp Glu Ala Gly Ala Glu Tyr Leu Gly Arg Arg Gly Met Arg
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Pro Met Ala Pro Val Ser Ala Leu Arg Ala Met Ala Thr Ala Ile Ala
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Ser Gly Glu Pro Cys Pro Thr Val Thr His Thr Asp Trp Glu Arg Phe
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Gly Glu Gly Phe Thr Ala Phe Arg Pro Ser Pro Leu Ile Ala Gly Leu
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Gly Thr Pro Gly Gly Gly Arg Ala Ala Glu Thr Pro Glu Glu Gly Asn
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Ala Thr Ala Ala Ala Asp Leu Thr Ala Leu Pro Pro Ala Glu Leu Arg
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Thr Ala Leu Arg Glu Leu Val Arg Ala Arg Thr Ala Ala Ala Leu Gly
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Leu Asp Asp Pro Ala Glu Val Ala Glu Gly Glu Arg Phe Pro Ala Met
                4260                4265                4270
Gly Phe Asp Ser Leu Ala Thr Val Arg Leu Arg Arg Gly Leu Ala Ser
    4275                4280                4285
Ala Thr Gly Leu Asp Leu Pro Pro Asp Leu Leu Phe Asp Arg Asp Thr
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Pro Ala Ala Leu Ala Ala His Leu Ala Glu Leu Leu Ala Thr Ala Arg
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Gly Ser Gly Leu Pro Ala Leu Tyr Arg Glu Ala Val Arg Thr Gly Arg
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Asp Gly Ala Glu Asp Thr Gly Leu Pro Leu Leu Val Gly Cys Ala Gly
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Thr Ala Val Ala Ser Gly Pro Val Glu Phe Thr Ala Phe Ala Gly Ala
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Gly Phe Leu Pro Gly Glu Arg Val Pro Ala Thr Pro Glu Ala Leu Phe
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Glu Ala Gln Ala Glu Ala Leu Leu Arg Tyr Ala Ala Gly Arg Pro Phe
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Val Leu Leu Gly His Ser Ala Gly Ala Asn Met Ala His Ala Leu Thr
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Arg His Leu Glu Ala Asn Gly Gly Gly Pro Ala Gly Leu Val Leu Met
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Asp Ile Tyr Thr Pro Ala Asp Pro Gly Ala Met Gly Val Trp Arg Asn
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Asp Met Phe Gln Trp Val Trp Arg Arg Ser Asp Ile Pro Pro Asp Asp
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His Arg Leu Thr Ala Met Gly Ala Tyr His Arg Leu Leu Leu Asp Trp
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14

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Met Thr Glu His Ala Ser Ala Ala Ala Arg Leu Val His Gly Trp Leu
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Gly Arg Glu Glu Arg Pro
4625   4630

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15

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17

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<212> PRT
<213> Streptomyces venezuelae

<400> 4
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                20                  25                  30
Thr Arg Gly Ile His Trp Ile His Ala Ala Asn Gly Asp Pro Tyr Ala
                35                  40                  45
Thr Val Leu Arg Gly Gln Ala Asp Asp Pro Tyr Pro Ala Tyr Glu Arg
        50                  55                  60
Val Arg Ala Arg Gly Ala Leu Ser Phe Ser Pro Thr Gly Ser Trp Val
65                  70                  75                  80
Thr Ala Asp His Ala Leu Ala Ala Ser Ile Leu Cys Ser Thr Asp Phe
                85                  90                  95
Gly Val Ser Gly Ala Asp Gly Val Pro Val Pro Gln Gln Val Leu Ser
            100                 105                 110
Tyr Gly Glu Gly Cys Pro Leu Glu Arg Glu Gln Val Leu Pro Ala Ala
        115                 120                 125
Gly Asp Val Pro Glu Gly Gly Gln Arg Ala Val Val Glu Gly Ile His
    130                 135                 140
Arg Glu Thr Leu Glu Gly Leu Ala Pro Asp Pro Ser Ala Ser Tyr Ala
145                 150                 155                 160
Phe Glu Leu Leu Gly Gly Phe Val Arg Pro Ala Val Thr Ala Ala Ala
                165                 170                 175
Ala Ala Val Leu Gly Val Pro Ala Asp Arg Arg Ala Asp Phe Ala Asp
            180                 185                 190
Leu Leu Glu Arg Leu Arg Pro Leu Ser Asp Ser Leu Leu Ala Pro Gln
        195                 200                 205
Ser Leu Arg Thr Val Arg Ala Ala Asp Gly Ala Leu Ala Glu Leu Thr
    210                 215                 220
Ala Leu Leu Ala Asp Ser Asp Asp Ser Pro Gly Ala Leu Leu Ser Ala
225                 230                 235                 240
Leu Gly Val Thr Ala Ala Val Gln Leu Thr Gly Asn Ala Val Leu Ala
                245                 250                 255
Leu Leu Ala His Pro Glu Gln Trp Arg Glu Leu Cys Asp Arg Pro Gly
            260                 265                 270
Leu Ala Ala Ala Ala Val Glu Glu Thr Leu Arg Tyr Asp Pro Pro Val
        275                 280                 285
Gln Leu Asp Ala Arg Val Val Arg Gly Glu Thr Glu Leu Ala Gly Arg
    290                 295                 300
Arg Leu Pro Ala Gly Ala His Val Val Val Leu Thr Ala Ala Thr Gly
305                 310                 315                 320
Arg Asp Pro Glu Val Phe Thr Asp Pro Glu Arg Phe Asp Leu Ala Arg
                325                 330                 335
Pro Asp Ala Ala Ala His Leu Ala Leu His Pro Ala Gly Pro Tyr Gly
        340                 345                 350
Pro Val Ala Ser Leu Val Arg Leu Gln Ala Glu Val Ala Leu Arg Thr
        355                 360                 365
Leu Ala Gly Arg Phe Pro Gly Leu Arg Gln Ala Gly Asp Val Leu Arg
    370                 375                 380
Pro Arg Arg Ala Pro Val Gly Arg Gly Pro Leu Ser Val Pro Val Ser
385                 390                 395                 400
Ser Ser Met Arg Val Leu Leu Thr Ser Phe Ala His His Thr His Tyr
                405                 410                 415
Tyr Gly Leu Val Pro Leu Ala Trp Ala Leu Leu Ala Ala Gly His Glu
            420                 425                 430
Val Arg Val Ala Ser Gln Pro Ala Leu Thr Asp Thr Ile Thr Gly Ser
        435                 440                 445
```

19

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Gly Leu Ala Ala Val Pro Val Gly Thr Asp His Leu Ile His Glu Tyr
    450             455             460
Arg Val Arg Met Ala Gly Glu Pro Arg Pro Asn His Pro Ala Ile Ala
465             470             475             480
Phe Asp Glu Ala Arg Pro Glu Pro Leu Asp Trp Asp His Ala Leu Gly
            485             490             495
Ile Glu Ala Ile Leu Ala Pro Tyr Phe His Leu Leu Ala Asn Asn Asp
        500             505             510
Ser Met Val Asp Asp Leu Val Asp Phe Ala Arg Ser Trp Gln Pro Asp
        515             520             525
Leu Val Leu Trp Glu Pro Thr Thr Tyr Ala Gly Ala Val Ala Ala Gln
    530             535             540
Val Thr Gly Ala Ala His Ala Arg Val Leu Trp Gly Pro Asp Val Met
545             550             555             560
Gly Ser Ala Arg Arg Lys Phe Val Ala Leu Arg Asp Arg Gln Pro Pro
            565             570             575
Glu His Arg Glu Asp Pro Thr Ala Glu Trp Leu Thr Trp Thr Leu Asp
            580             585             590
Arg Tyr Gly Ala Ser Phe Glu Glu Glu Leu Leu Thr Gly Gln Phe Thr
    595             600             605
Ile Asp Pro Thr Pro Pro Ser Leu Arg Leu Asp Thr Gly Leu Pro Thr
    610             615             620
Val Gly Met Arg Tyr Val Pro Tyr Asn Gly Thr Ser Val Val Pro Asp
625             630             635             640
Trp Leu Ser Glu Pro Pro Ala Arg Pro Arg Val Cys Leu Thr Leu Gly
            645             650             655
Val Ser Ala Arg Glu Val Leu Gly Gly Asp Gly Val Ser Gln Gly Asp
            660             665             670
Ile Leu Glu Ala Leu Ala Asp Leu Asp Ile Glu Leu Val Ala Thr Leu
    675             680             685
Asp Ala Ser Gln Arg Ala Glu Ile Arg Asn Tyr Pro Lys His Thr Arg
    690             695             700
Phe Thr Asp Phe Val Pro Met His Ala Leu Leu Pro Ser Cys Ser Ala
705             710             715             720
Ile Ile His His Gly Gly Ala Gly Thr Tyr Ala Thr Ala Val Ile Asn
            725             730             735
Ala Val Pro Gln Val Met Leu Ala Glu Leu Trp Asp Ala Pro Val Lys
            740             745             750
Ala Arg Ala Val Ala Glu Gln Gly Ala Gly Phe Phe Leu Pro Pro Ala
    755             760             765
Glu Leu Thr Pro Gln Ala Val Arg Asp Ala Val Val Arg Ile Leu Asp
    770             775             780
Asp Pro Ser Val Ala Thr Ala Ala His Arg Leu Arg Glu Glu Thr Phe
785             790             795             800
Gly Asp Pro Thr Pro Ala Gly Ile Val Pro Glu Leu Glu Arg Leu Ala
            805             810             815
Ala Gln His Arg Arg Pro Pro Ala Asp Ala Arg His Met Tyr Glu Val
            820             825             830
Asp His Ala Asp Val Tyr Asp Leu Phe Tyr Leu Gly Arg Gly Lys Asp
    835             840             845
Tyr Ala Ala Glu Ala Ser Asp Ile Ala Asp Leu Val Arg Ser Arg Thr
    850             855             860
Pro Glu Ala Ser Ser Leu Leu Asp Val Ala Cys Gly Thr Gly Thr His
865             870             875             880
Leu Glu His Phe Thr Lys Glu Phe Gly Asp Thr Ala Gly Leu Glu Leu
            885             890             895
Ser Glu Asp Met Leu Thr His Ala Arg Lys Arg Leu Pro Asp Ala Thr
            900             905             910
Leu His Gln Gly Asp Met Arg Asp Phe Arg Leu Gly Arg Lys Phe Ser
    915             920             925
Ala Val Val Ser Met Phe Ser Ser Val Gly Tyr Leu Lys Thr Thr Glu
    930             935             940
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20

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Glu Leu Gly Ala Ala Val Ala Ser Phe Ala Glu His Leu Glu Pro Gly
945                 950                 955                 960
Gly Val Val Val Val Glu Pro Trp Trp Phe Pro Glu Thr Phe Ala Asp
                965                 970                 975
Gly Trp Val Ser Ala Asp Val Val Arg Arg Asp Gly Arg Thr Val Ala
                980                 985                 990
Arg Val Ser His Ser Val Arg Glu Gly Asn Ala Thr Arg Met Glu Val
                995                 1000                1005
His Phe Thr Val Ala Asp Pro Gly Lys Gly Val Arg His Phe Ser Asp
     1010                1015                1020
Val His Leu Ile Thr Leu Phe His Gln Ala Glu Tyr Glu Ala Ala Phe
1025                1030                1035                1040
Thr Ala Ala Gly Leu Arg Val Glu Tyr Leu Glu Gly Gly Pro Ser Gly
                1045                1050                1055
Arg Gly Leu Phe Val Gly Val Pro Ala Met Thr Gly Lys Thr Arg Ile
                1060                1065                1070
Pro Arg Val Arg Arg Gly Arg Thr Thr Pro Arg Ala Phe Thr Leu Ala
                1075                1080                1085
Val Val Gly Thr Leu Leu Ala Gly Thr Thr Val Ala Ala Ala Ala Pro
     1090                1095                1100
Gly Ala Ala Asp Thr Ala Asn Val Gln Tyr Thr Ser Arg Ala Ala Glu
1105                1110                1115                1120
Leu Val Ala Gln Met Thr Leu Asp Glu Lys Ile Ser Phe Val His Trp
                1125                1130                1135
Ala Leu Asp Pro Asp Arg Gln Asn Val Gly Tyr Leu Pro Gly Val Pro
                1140                1145                1150
Arg Leu Gly Ile Pro Glu Leu Arg Ala Ala Asp Gly Pro Asn Gly Ile
                1155                1160                1165
Arg Leu Val Gly Gln Thr Ala Thr Ala Leu Pro Ala Pro Val Ala Leu
     1170                1175                1180
Ala Ser Thr Phe Asp Asp Thr Met Ala Asp Ser Tyr Gly Lys Val Met
1185                1190                1195                1200
Gly Arg Asp Gly Arg Ala Leu Asn Gln Asp Met Val Leu Gly Pro Met
                1205                1210                1215
Met Asn Asn Ile Arg Val Pro His Gly Gly Arg Asn Tyr Glu Thr Phe
                1220                1225                1230
Ser Glu Asp Pro Leu Val Ser Ser Arg Thr Ala Val Ala Gln Ile Lys
     1235                1240                1245
Gly Ile Gln Gly Ala Gly Leu Met Thr Thr Ala Lys His Phe Ala Ala
     1250                1255                1260
Asn Asn Gln Glu Asn Asn Arg Phe Ser Val Asn Ala Asn Val Asp Glu
1265                1270                1275                1280
Gln Thr Leu Arg Glu Ile Glu Phe Pro Ala Phe Glu Ala Ser Ser Lys
                1285                1290                1295
Ala Gly Ala Ala Ser Phe Met Cys Ala Tyr Asn Gly Leu Asn Gly Lys
                1300                1305                1310
Pro Ser Cys Gly Asn Asp Glu Leu Leu Asn Asn Val Leu Arg Thr Gln
     1315                1320                1325
Trp Gly Phe Gln Gly Trp Val Met Ser Asp Trp Leu Ala Thr Pro Gly
     1330                1335                1340
Thr Asp Ala Ile Thr Lys Gly Leu Asp Gln Glu Met Gly Val Glu Leu
1345                1350                1355                1360
Pro Gly Asp Val Pro Lys Gly Glu Pro Ser Pro Pro Ala Lys Phe Phe
                1365                1370                1375
Gly Glu Ala Leu Lys Thr Ala Val Leu Asn Gly Thr Val Pro Glu Ala
                1380                1385                1390
Ala Val Thr Arg Ser Ala Glu Arg Ile Val Gly Gln Met Glu Lys Phe
                1395                1400                1405
Gly Leu Leu Leu Ala Thr Pro Ala Pro Arg Pro Glu Arg Asp Lys Ala
     1410                1415                1420
Gly Ala Gln Ala Val Ser Arg Lys Val Ala Glu Asn Gly Ala Val Leu
1425                1430                1435                1440
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21

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Leu Arg Asn Glu Gly Gln Ala Leu Pro Leu Ala Gly Asp Ala Gly Lys
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Ser Ile Ala Val Ile Gly Pro Thr Ala Val Asp Pro Lys Val Thr Gly
              1460                1465                1470
Leu Gly Ser Ala His Val Val Pro Asp Ser Ala Ala Ala Pro Leu Asp
          1475                1480                1485
Thr Ile Lys Ala Arg Ala Gly Ala Gly Ala Thr Val Thr Tyr Glu Thr
      1490                1495                1500
Gly Glu Glu Thr Phe Gly Thr Gln Ile Pro Ala Gly Asn Leu Ser Pro
1505                1510                1515                1520
Ala Phe Asn Gln Gly His Gln Leu Glu Pro Gly Lys Ala Gly Ala Leu
              1525                1530                1535
Tyr Asp Gly Thr Leu Thr Val Pro Ala Asp Gly Glu Tyr Arg Ile Ala
              1540                1545                1550
Val Arg Ala Thr Gly Gly Tyr Ala Thr Val Gln Leu Gly Ser His Thr
          1555                1560                1565
Ile Glu Ala Gly Gln Val Tyr Gly Lys Val Ser Ser Pro Leu Leu Lys
      1570                1575                1580
Leu Thr Lys Gly Thr His Lys Leu Thr Ile Ser Gly Phe Ala Met Ser
1585                1590                1595                1600
Ala Thr Pro Leu Ser Leu Glu Leu Gly Trp Val Thr Pro Ala Ala Ala
              1605                1610                1615
Asp Ala Thr Ile Ala Lys Ala Val Glu Ser Ala Arg Lys Ala Arg Thr
              1620                1625                1630
Ala Val Val Phe Ala Tyr Asp Asp Gly Thr Glu Gly Val Asp Arg Pro
          1635                1640                1645
Asn Leu Ser Leu Pro Gly Thr Gln Asp Lys Leu Ile Ser Ala Val Ala
      1650                1655                1660
Asp Ala Asn Pro Asn Thr Ile Val Val Leu Asn Thr Gly Ser Ser Val
1665                1670                1675                1680
Leu Met Pro Trp Leu Ser Lys Thr Arg Ala Val Leu Asp Met Trp Tyr
              1685                1690                1695
Pro Gly Gln Ala Gly Ala Glu Ala Thr Ala Ala Leu Leu Tyr Gly Asp
          1700                1705                1710
Val Asn Pro Ser Gly Lys Leu Thr Gln Ser Phe Pro Ala Ala Glu Asn
      1715                1720                1725
Gln His Ala Val Ala Gly Asp Pro Thr Ser Tyr Pro Gly Val Asp Asn
      1730                1735                1740
Gln Gln Thr Tyr Arg Glu Gly Ile His Val Gly Tyr Arg Trp Phe Asp
1745                1750                1755                1760
Lys Glu Asn Val Lys Pro Leu Phe Pro Phe Gly His Gly Leu Ser Tyr
              1765                1770                1775
Thr Ser Phe Thr Gln Ser Ala Pro Thr Val Val Arg Thr Ser Thr Gly
          1780                1785                1790
Gly Leu Lys Val Thr Val Thr Val Arg Asn Ser Gly Lys Arg Ala Gly
          1795                1800                1805
Gln Glu Val Val Gln Ala Tyr Leu Gly Ala Ser Pro Asn Val Thr Ala
      1810                1815                1820
Pro Gln Ala Lys Lys Lys Leu Val Gly Tyr Thr Lys Val Ser Leu Ala
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Ala Gly Glu Ala Lys Thr Val Thr Val Asn Val Asp Arg Arg Gln Leu
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Gln Thr Gly Ser Ser Ser Ala Asp Leu Arg Gly Ser Ala Thr Val Asn
          1860                1865                1870
Val Trp Met Ser Ser Arg Ala Glu Thr Pro Arg Val Pro Phe Leu Asp
          1875                1880                1885
Leu Lys Ala Ala Tyr Glu Glu Leu Arg Ala Glu Thr Asp Ala Ala Ile
      1890                1895                1900
Ala Arg Val Leu Asp Ser Gly Arg Tyr Leu Leu Gly Pro Glu Leu Glu
1905                1910                1915                1920
Gly Phe Glu Ala Glu Phe Ala Ala Tyr Cys Glu Thr Asp His Ala Val
              1925                1930                1935
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Gly Val Asn Ser Gly Met Asp Ala Leu Gln Leu Ala Leu Arg Gly Leu
          1940                1945                1950
Gly Ile Gly Pro Gly Asp Glu Val Ile Val Pro Ser His Thr Tyr Ile
          1955                1960                1965
Ala Ser Trp Leu Ala Val Ser Ala Thr Gly Ala Thr Pro Val Pro Val
          1970                1975                1980
Glu Pro His Glu Asp His Pro Thr Leu Asp Pro Leu Leu Val Glu Lys
1985                1990                1995                2000
Ala Ile Thr Pro Arg Thr Arg Ala Leu Leu Pro Val His Leu Tyr Gly
          2005                2010                2015
His Pro Ala Asp Met Asp Ala Leu Arg Glu Leu Ala Asp Arg His Gly
          2020                2025                2030
Leu His Ile Val Glu Asp Ala Ala Gln Ala His Gly Ala Arg Tyr Arg
          2035                2040                2045
Gly Arg Arg Ile Gly Ala Gly Ser Ser Val Ala Ala Phe Ser Phe Tyr
          2050                2055                2060
Pro Gly Lys Asn Leu Gly Cys Phe Gly Asp Gly Gly Ala Val Val Thr
2065                2070                2075                2080
Gly Asp Pro Glu Leu Ala Glu Arg Leu Arg Met Leu Arg Asn Tyr Gly
          2085                2090                2095
Ser Arg Gln Lys Tyr Ser His Glu Thr Lys Gly Thr Asn Ser Arg Leu
          2100                2105                2110
Asp Glu Met Gln Ala Ala Val Leu Arg Ile Arg Leu Ala His Leu Asp
          2115                2120                2125
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Leu Ala Gly Leu Pro Gly Ile Gly Leu Pro Val Thr Ala Pro Asp Thr
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Asp Pro Val Trp His Leu Phe Thr Val Arg Thr Glu Arg Arg Asp Glu
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Leu Arg Ser His Leu Asp Ala Arg Gly Ile Asp Thr Leu Thr His Tyr
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Pro Val Pro Val His Leu Ser Pro Ala Tyr Ala Gly Glu Ala Pro Pro
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Glu Gly Ser Leu Pro Arg Ala Glu Ser Phe Ala Arg Gln Val Leu Ser
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Leu Pro Ile Gly Pro His Leu Glu Arg Pro Gln Ala Leu Arg Val Ile
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Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Phe Val Arg Gln
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Leu Leu Ala Gly Ala Tyr Pro Asp Val Pro Ala Asp Glu Val Ile Val
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Leu Asp Ser Leu Thr Tyr Ala Gly Asn Arg Ala Asn Leu Ala Pro Val
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Ala Tyr His Arg Thr Tyr Gly Leu Asp Val Arg Ile Thr Arg Cys Cys
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23

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Ala Leu Val Leu Ala Gly Gly Arg Ala Gly Glu Ile Tyr His Ile Gly
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Gly His Asp Leu Arg Tyr Ser Leu Asp Gly Gly Glu Ile Glu Arg Glu
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Ile Ile Ser Thr Pro Gln His Ile Glu Leu Phe Gln Ser Leu Leu Gly
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Pro Ala Gly Ile Ala Asp Ala Leu Leu Val Gly Ala Glu His Ile Gly
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24

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Pro Asn Arg Ile Asp Arg Ala Arg Leu Tyr Glu Arg Leu Asp Arg Ala
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25

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Tyr Val Ile Val Glu Ile Asp Glu Ala Thr Thr Gly Ile His Arg Asp
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26

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27

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34

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35

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36

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<211> 12199
<212> PRT
<213> Streptomyces venezuelae

<400> 6
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             20                  25                  30
Thr Lys Gly Pro Ile Leu Glu Ile Gly Pro Gly Asp Gly Ala Leu Thr
         35                  40                  45
Leu Pro Leu Ser Arg His Gly Arg Pro Ile Thr Ala Val Glu Leu Asp
     50                  55                  60
Gly Arg Arg Ala Gln Arg Leu Gly Ala Arg Thr Pro Gly His Val Thr
65                  70                  75                  80
Val Val His His Asp Phe Leu Gln Tyr Pro Leu Pro Arg Asn Pro His
                 85                  90                  95
Val Val Val Gly Asn Val Pro Phe His Leu Thr Thr Ala Ile Met Arg
            100                 105                 110
Arg Leu Leu Asp Ala Gln His Trp His Thr Ala Val Leu Leu Val Gln
        115                 120                 125
Trp Glu Val Ala Arg Arg Arg Ala Gly Val Gly Gly Ser Thr Leu Leu
    130                 135                 140
Thr Ala Gly Trp Ala Pro Trp Tyr Glu Phe Asp Leu His Ser Arg Val
145                 150                 155                 160
Pro Ala Arg Ala Phe Arg Pro Met Pro Gly Val Asp Gly Gly Val Leu
                165                 170                 175
Ala Ile Arg Arg Arg Ser Ala Pro Leu Val Gly Gln Val Lys Thr Tyr
            180                 185                 190
Gln Asp Phe Val Arg Gln Val Phe Thr Gly Lys Gly Asn Gly Leu Lys
        195                 200                 205
Glu Ile Leu Arg Arg Thr Gly Arg Ile Ser Gln Arg Asp Leu Ala Thr
    210                 215                 220
Trp Leu Arg Arg Asn Glu Ile Ser Pro His Ala Leu Pro Lys Asp Leu
225                 230                 235                 240
Lys Pro Gly Gln Trp Ala Ser Leu Trp Glu Leu Thr Gly Gly Thr Ala
                245                 250                 255
Asp Gly Ser Phe Asp Gly Thr Ala Gly Gly Gly Ala Ala Gly Ser His
            260                 265                 270
Gly Ala Ala Arg Val Gly Ala Gly His Pro Gly Gly Arg Val Ser Ala
        275                 280                 285
Ser Arg Arg Gly Val Pro Gln Ala Arg Arg Gly Arg Gly His Ala Val
    290                 295                 300
Arg Ser Ser Thr Gly Thr Glu Pro Arg Trp Gly Arg Gly Arg Ala Glu
305                 310                 315                 320
Ser Ala Met Ala Met Arg Asp Ser Ile Pro Arg Arg Ala Asp Arg Asp
                325                 330                 335
Thr Leu Arg Arg Glu Leu Gly Gln Asn Phe Leu Gln Asp Asp Arg Ala
            340                 345                 350
Val Arg Asn Leu Val Thr His Val Glu Gly Asp Gly Arg Asn Val Leu
        355                 360                 365
Glu Ile Gly Pro Gly Lys Gly Ala Ile Thr Glu Glu Leu Val Arg Ser
    370                 375                 380
```

37

```
Phe Asp Thr Val Thr Val Val Glu Met Asp Pro His Trp Ala Ala His
385             390             395                         400
Val Arg Arg Lys Phe Glu Gly Glu Arg Val Thr Val Phe Gln Gly Asp
            405             410             415
Phe Leu Asp Phe Arg Ile Pro Arg Asp Ile Asp Thr Val Val Gly Asn
            420             425             430
Val Pro Phe Gly Ile Thr Thr Gln Ile Leu Arg Ser Leu Leu Glu Ser
            435             440             445
Thr Asn Trp Gln Ser Ala Ala Leu Ile Val Gln Trp Glu Val Ala Arg
    450             455             460
Lys Arg Ala Gly Arg Ser Gly Gly Ser Leu Leu Thr Thr Ser Trp Ala
465             470             475                         480
Pro Trp Tyr Glu Phe Ala Val His Asp Arg Val Arg Ala Ser Ser Phe
            485             490             495
Arg Pro Met Pro Arg Val Asp Gly Gly Val Leu Thr Ile Arg Arg Arg
            500             505             510
Pro Gln Pro Leu Leu Pro Glu Ser Ala Ser Arg Ala Phe Gln Asn Phe
            515             520             525
Ala Glu Ala Val Phe Thr Gly Pro Gly Arg Gly Leu Ala Glu Ile Leu
            530             535             540
Arg Arg His Ile Pro Lys Arg Thr Tyr Arg Ser Leu Ala Asp Arg His
545             550             555                         560
Gly Ile Pro Asp Gly Gly Leu Pro Lys Asp Leu Thr Leu Thr Gln Trp
            565             570             575
Ile Ala Leu Phe Gln Ala Ser Gln Pro Ser Tyr Ala Pro Gly Ala Pro
            580             585             590
Gly Thr Arg Met Pro Gly Gln Gly Gly Gly Ala Gly Gly Arg Asp Tyr
            595             600             605
Asp Ser Glu Thr Ser Arg Ala Ala Val Pro Gly Ser Arg Arg Tyr Gly
            610             615             620
Pro Thr Arg Gly Gly Glu Pro Cys Ala Pro Arg Ala Gln Val Arg Gln
625             630             635                         640
Thr Lys Gly Arg Gln Gly Ala Arg Gly Ser Ser Tyr Gly Arg Arg Thr
            645             650             655
Gly Arg Met Ser Ser Ala Gly Ile Thr Arg Thr Gly Ala Arg Thr Pro
            660             665             670
Val Thr Gly Arg Gly Ala Ala Ala Trp Asp Thr Gly Glu Val Arg Val
            675             680             685
Arg Arg Gly Leu Pro Pro Ala Gly Pro Asp His Ala Glu His Ser Phe
690             695             700
Ser Arg Ala Pro Thr Gly Asp Val Arg Ala Glu Leu Ile Arg Gly Glu
705             710             715                         720
Met Ser Thr Val Ser Lys Ser Glu Ser Glu Glu Phe Val Ser Val Ser
            725             730             735
Asn Asp Ala Gly Ser Ala His Gly Thr Ala Glu Pro Val Ala Val Val
            740             745             750
Gly Ile Ser Cys Arg Val Pro Gly Ala Arg Asp Pro Arg Glu Phe Trp
            755             760             765
Glu Leu Leu Ala Ala Gly Gly Gln Ala Val Thr Asp Val Pro Ala Asp
            770             775             780
Arg Trp Asn Ala Gly Asp Phe Tyr Asp Pro Asp Arg Ser Ala Pro Gly
785             790             795                         800
Arg Ser Asn Ser Arg Trp Gly Gly Phe Ile Glu Asp Val Asp Arg Phe
            805             810             815
Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Ala Glu Met Asp
            820             825             830
Pro Gln Gln Arg Leu Ala Leu Glu Leu Gly Trp Glu Ala Leu Glu Arg
            835             840             845
Ala Gly Ile Asp Pro Ser Ser Leu Thr Gly Thr Arg Thr Gly Val Phe
            850             855             860
Ala Gly Ala Ile Trp Asp Asp Tyr Ala Thr Leu Lys His Arg Gln Gly
865             870             875                         880
```

38

```
Gly Ala Ala Ile Thr Pro His Thr Val Thr Gly Leu His Arg Gly Ile
            885                 890                 895
Ile Ala Asn Arg Leu Ser Tyr Thr Leu Gly Leu Arg Gly Pro Ser Met
            900                 905                 910
Val Val Asp Ser Gly Gln Ser Ser Ser Leu Val Ala Val His Leu Ala
            915                 920                 925
Cys Glu Ser Leu Arg Arg Gly Glu Ser Glu Leu Ala Leu Ala Gly Gly
        930                 935                 940
Val Ser Leu Asn Leu Val Pro Asp Ser Ile Ile Gly Ala Ser Lys Phe
    945                 950                 955                 960
Gly Gly Leu Ser Pro Asp Gly Arg Ala Tyr Thr Phe Asp Ala Arg Ala
                965                 970                 975
Asn Gly Tyr Val Arg Gly Glu Gly Gly Gly Phe Val Val Leu Lys Arg
            980                 985                 990
Leu Ser Arg Ala Val Ala Asp Gly Asp Pro Val Leu Ala Val Ile Arg
        995                 1000                1005
Gly Ser Ala Val Asn Asn Gly Gly Ala Ala Gln Gly Met Thr Thr Pro
    1010                1015                1020
Asp Ala Gln Ala Gln Glu Ala Val Leu Arg Glu Ala His Glu Arg Ala
1025                1030                1035                1040
Gly Thr Ala Pro Ala Asp Val Arg Tyr Val Glu Leu His Gly Thr Gly
            1045                1050                1055
Thr Pro Val Gly Asp Pro Ile Glu Ala Ala Ala Leu Gly Ala Ala Leu
            1060                1065                1070
Gly Thr Gly Arg Pro Ala Gly Gln Pro Leu Leu Val Gly Ser Val Lys
            1075                1080                1085
Thr Asn Ile Gly His Leu Glu Gly Ala Ala Gly Ile Ala Gly Leu Ile
            1090                1095                1100
Lys Ala Val Leu Ala Val Arg Gly Arg Ala Leu Pro Ala Ser Leu Asn
1105                1110                1115                1120
Tyr Glu Thr Pro Asn Pro Ala Ile Pro Phe Glu Glu Leu Asn Leu Arg
            1125                1130                1135
Val Asn Thr Glu Tyr Leu Pro Trp Glu Pro Glu His Asp Gly Gln Arg
            1140                1145                1150
Met Val Val Gly Val Ser Ser Phe Gly Met Gly Gly Thr Asn Ala His
    1155                1160                1165
Val Val Leu Glu Glu Ala Pro Gly Gly Cys Arg Gly Ala Ser Val Val
    1170                1175                1180
Glu Ser Thr Val Gly Gly Ser Ala Val Gly Gly Gly Val Val Pro Trp
1185                1190                1195                1200
Val Val Ser Ala Lys Ser Ala Ala Ala Leu Asp Ala Gln Ile Glu Arg
            1205                1210                1215
Leu Ala Ala Phe Ala Ser Arg Asp Arg Thr Asp Gly Val Asp Ala Gly
            1220                1225                1230
Ala Val Asp Ala Gly Ala Val Asp Ala Gly Ala Val Ala Arg Val Leu
    1235                1240                1245
Ala Gly Gly Arg Ala Gln Phe Glu His Arg Ala Val Val Val Gly Ser
    1250                1255                1260
Gly Pro Asp Asp Leu Ala Ala Ala Leu Ala Ala Pro Glu Gly Leu Val
1265                1270                1275                1280
Arg Gly Val Ala Ser Gly Val Gly Arg Val Ala Phe Val Phe Pro Gly
            1285                1290                1295
Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp Ser Ser
        1300                1305                1310
Ala Val Phe Ala Ala Ala Met Ala Glu Cys Glu Ala Ala Leu Ser Pro
    1315                1320                1325
Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro Gly Ala
    1330                1335                1340
Pro Thr Leu Glu Arg Val Asp Val Val Gln Pro Val Thr Phe Ala Val
1345                1350                1355                1360
Met Val Ser Leu Ala Arg Val Trp Gln His His Gly Val Thr Pro Gln
            1365                1370                1375
```

39

```
Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala
            1380                1385                1390
Gly Ala Leu Ser Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser
            1395                1400                1405
Lys Ser Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Leu Ser Leu
    1410                1415                1420
Ala Leu Ser Glu Asp Ala Val Leu Glu Arg Leu Ala Gly Phe Asp Gly
1425                1430                1435                1440
Leu Ser Val Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly
            1445                1450                1455
Asp Pro Val Gln Ile Glu Glu Leu Ala Arg Ala Cys Glu Ala Asp Gly
            1460                1465                1470
Val Arg Ala Arg Val Ile Pro Val Asp Tyr Ala Ser His Ser Arg Gln
            1475                1480                1485
Val Glu Ile Ile Glu Ser Glu Leu Ala Glu Val Leu Ala Gly Leu Ser
    1490                1495                1500
Pro Gln Ala Pro Arg Val Pro Phe Phe Ser Thr Leu Glu Gly Ala Trp
1505                1510                1515                1520
Ile Thr Glu Pro Val Leu Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg
            1525                1530                1535
His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu
            1540                1545                1550
Gly Phe Thr His Phe Val Glu Val Ser Ala His Pro Val Leu Thr Met
            1555                1560                1565
Ala Leu Pro Gly Thr Val Thr Gly Leu Ala Thr Leu Arg Arg Asp Asn
    1570                1575                1580
Gly Gly Gln Asp Arg Leu Val Ala Ser Leu Ala Glu Ala Trp Ala Asn
1585                1590                1595                1600
Gly Leu Ala Val Asp Trp Ser Pro Leu Leu Pro Ser Ala Thr Gly His
            1605                1610                1615
His Ser Asp Leu Pro Thr Tyr Ala Phe Gln Thr Glu Arg His Trp Leu
            1620                1625                1630
Gly Glu Ile Glu Ala Leu Ala Pro Ala Gly Glu Pro Ala Val Gln Pro
    1635                1640                1645
Ala Val Leu Arg Thr Glu Ala Ala Glu Pro Ala Glu Leu Asp Arg Asp
    1650                1655                1660
Glu Gln Leu Arg Val Ile Leu Asp Lys Val Arg Ala Gln Thr Ala Gln
1665                1670                1675                1680
Val Leu Gly Tyr Ala Thr Gly Gly Gln Ile Glu Val Asp Arg Thr Phe
            1685                1690                1695
Arg Glu Ala Gly Cys Thr Ser Leu Thr Gly Val Asp Leu Arg Asn Arg
            1700                1705                1710
Ile Asn Ala Ala Phe Gly Val Arg Met Ala Pro Ser Met Ile Phe Asp
    1715                1720                1725
Phe Pro Thr Pro Glu Ala Leu Ala Glu Gln Leu Leu Leu Val Val His
    1730                1735                1740
Gly Glu Ala Ala Ala Asn Pro Ala Gly Ala Glu Pro Ala Pro Val Ala
1745                1750                1755                1760
Ala Ala Gly Ala Val Asp Glu Pro Val Ala Ile Val Gly Met Ala Cys
            1765                1770                1775
Arg Leu Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Arg Leu Val
            1780                1785                1790
Ala Gly Gly Gly Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp
    1795                1800                1805
Asp Val Glu Gly Leu Tyr His Pro Asp Pro Glu His Pro Gly Thr Ser
    1810                1815                1820
Tyr Val Arg Gln Gly Gly Phe Ile Glu Asn Val Ala Gly Phe Asp Ala
1825                1830                1835                1840
Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln
            1845                1850                1855
Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Val Glu Asp Ala Gly
            1860                1865                1870
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40

```
Ile Asp Pro Thr Ser Leu Arg Gly Arg Gln Val Gly Val Phe Thr Gly
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Ala Met Thr His Glu Tyr Gly Pro Ser Leu Arg Asp Gly Gly Glu Gly
        1890                1895                1900
Leu Asp Gly Tyr Leu Leu Thr Gly Asn Thr Ala Ser Val Met Ser Gly
1905                1910                1915                1920
Arg Val Ser Tyr Thr Leu Gly Leu Glu Gly Pro Ala Leu Thr Val Asp
                1925                1930                1935
Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala
        1940                1945                1950
Leu Arg Lys Gly Glu Val Asp Met Ala Leu Ala Gly Gly Val Ala Val
        1955                1960                1965
Met Pro Thr Pro Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu
        1970                1975                1980
Ala Gly Asp Gly Arg Ser Lys Ala Phe Ala Ala Ser Ala Asp Gly Thr
1985                1990                1995                2000
Ser Trp Ser Glu Gly Val Gly Val Leu Leu Val Glu Arg Leu Ser Asp
                2005                2010                2015
Ala Arg Arg Asn Gly His Gln Val Leu Ala Val Val Arg Gly Ser Ala
        2020                2025                2030
Leu Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro
        2035                2040                2045
Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Thr
        2050                2055                2060
Thr Ser Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu
2065                2070                2075                2080
Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Gly
                2085                2090                2095
Arg Asp Asp Glu Gln Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Ile
        2100                2105                2110
Gly His Thr Gln Ala Ala Ala Gly Val Ser Gly Val Ile Lys Met Val
        2115                2120                2125
Gln Ala Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu
        2130                2135                2140
Pro Ser Asp Gln Ile Asp Trp Ser Ala Gly Ala Val Glu Leu Leu Thr
2145                2150                2155                2160
Glu Ala Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala
                2165                2170                2175
Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu
        2180                2185                2190
Glu Glu Ala Pro Val Val Val Glu Gly Ala Ser Val Val Glu Pro Ser
        2195                2200                2205
Val Gly Gly Ser Ala Val Gly Gly Gly Val Thr Pro Trp Val Val Ser
        2210                2215                2220
Ala Lys Ser Ala Ala Ala Leu Asp Ala Gln Ile Glu Arg Leu Ala Ala
2225                2230                2235                2240
Phe Ala Ser Arg Asp Arg Thr Asp Asp Ala Asp Ala Gly Ala Val Asp
                2245                2250                2255
Ala Gly Ala Val Ala His Val Leu Ala Asp Gly Arg Ala Gln Phe Glu
                2260                2265                2270
His Arg Ala Val Ala Leu Gly Ala Gly Ala Asp Asp Leu Val Gln Ala
        2275                2280                2285
Leu Ala Asp Pro Asp Gly Leu Ile Arg Gly Thr Ala Ser Gly Val Gly
        2290                2295                2300
Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met
2305                2310                2315                2320
Gly Ala Glu Leu Leu Asp Ser Ser Ala Val Phe Ala Ala Ala Met Ala
                2325                2330                2335
Glu Cys Glu Ala Ala Leu Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala
                2340                2345                2350
Val Val Arg Gln Ala Pro Gly Ala Pro Thr Leu Glu Arg Val Asp Val
        2355                2360                2365
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41

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Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Arg Val Trp
    2370            2375            2380
Gln His His Gly Val Thr Pro Gln Ala Val Val Gly His Ser Gln Gly
2385            2390            2395            2400
Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Pro Leu Asp Asp Ala
                2405            2410            2415
Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala
                2420            2425            2430
Gly Lys Gly Gly Met Leu Ser Leu Ala Leu Asn Glu Asp Ala Val Leu
                2435            2440            2445
Glu Arg Leu Ser Asp Phe Asp Gly Leu Ser Val Ala Ala Val Asn Gly
                2450            2455            2460
Pro Thr Ala Thr Val Val Ser Gly Asp Pro Val Gln Ile Glu Glu Leu
2465            2470            2475            2480
Ala Gln Ala Cys Lys Ala Asp Gly Phe Arg Ala Arg Ile Ile Pro Val
                2485            2490            2495
Asp Tyr Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu Ser Glu Leu
                2500            2505            2510
Ala Gln Val Leu Ala Gly Leu Ser Pro Gln Ala Pro Arg Val Pro Phe
                2515            2520            2525
Phe Ser Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val Leu Asp Gly
                2530            2535            2540
Thr Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala
2545            2550            2555            2560
Ile Glu Thr Leu Ala Val Asp Glu Gly Phe Thr His Phe Val Glu Val
                2565            2570            2575
Ser Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly
                2580            2585            2590
Leu Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu Val Thr
                2595            2600            2605
Ser Leu Ala Glu Ala Trp Val Asn Gly Leu Pro Val Ala Trp Thr Ser
                2610            2615            2620
Leu Leu Pro Ala Thr Ala Ser Arg Pro Gly Leu Pro Thr Tyr Ala Phe
2625            2630            2635            2640
Gln Ala Glu Arg Tyr Trp Leu Glu Asn Thr Pro Ala Ala Leu Ala Thr
                2645            2650            2655
Gly Asp Asp Trp Arg Tyr Arg Ile Asp Trp Lys Arg Leu Pro Ala Ala
                2660            2665            2670
Glu Gly Ser Glu Arg Thr Gly Leu Ser Gly Arg Trp Leu Ala Val Thr
                2675            2680            2685
Pro Glu Asp His Ser Ala Gln Ala Ala Ala Val Leu Thr Ala Leu Val
                2690            2695            2700
Asp Ala Gly Ala Lys Val Glu Val Leu Thr Ala Gly Ala Asp Asp Asp
2705            2710            2715            2720
Arg Glu Ala Leu Ala Ala Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly
                2725            2730            2735
Phe Thr Gly Val Val Ser Leu Leu Asp Gly Leu Val Pro Gln Val Ala
                2740            2745            2750
Trp Val Gln Ala Leu Gly Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser
                2755            2760            2765
Val Thr Gln Gly Ala Val Ser Val Gly Arg Leu Asp Thr Pro Ala Asp
                2770            2775            2780
Pro Asp Arg Ala Met Leu Trp Gly Leu Gly Arg Val Val Ala Leu Glu
2785            2790            2795            2800
His Pro Glu Arg Trp Ala Gly Leu Val Asp Leu Pro Ala Gln Pro Asp
                2805            2810            2815
Ala Ala Ala Leu Ala His Leu Val Thr Ala Leu Ser Gly Ala Thr Gly
                2820            2825            2830
Glu Asp Gln Ile Ala Ile Arg Thr Thr Gly Leu His Ala Arg Arg Leu
                2835            2840            2845
Ala Arg Ala Pro Leu His Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro
    2850            2855            2860
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42

```
His Gly Thr Val Leu Ile Thr Gly Gly Thr Gly Ala Leu Gly Ser His
2865            2870           2875           2880
Ala Ala Arg Trp Met Ala His His Gly Ala Glu His Leu Leu Leu Val
           2885           2890           2895
Ser Arg Ser Gly Glu Gln Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu
           2900           2905           2910
Leu Thr Ala Ser Gly Ala Arg Val Thr Ile Ala Ala Cys Asp Val Ala
           2915           2920           2925
Asp Pro His Ala Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr
    2930           2935           2940
Pro Leu Thr Ala Val Val His Thr Ala Gly Ala Leu Asp Asp Gly Ile
2945           2950           2955           2960
Val Asp Thr Leu Thr Ala Glu Gln Val Arg Arg Ala His Arg Ala Lys
           2965           2970           2975
Ala Val Gly Ala Ser Val Leu Asp Glu Leu Thr Arg Asp Leu Asp Leu
           2980           2985           2990
Asp Ala Phe Val Leu Phe Ser Ser Val Ser Ser Thr Leu Gly Ile Pro
    2995           3000           3005
Gly Gln Gly Asn Tyr Ala Pro His Asn Ala Tyr Leu Asp Ala Leu Ala
    3010           3015           3020
Ala Arg Arg Arg Ala Thr Gly Arg Ser Ala Val Ser Val Ala Trp Gly
3025           3030           3035           3040
Pro Trp Asp Gly Gly Gly Met Ala Ala Gly Asp Gly Val Ala Glu Arg
           3045           3050           3055
Leu Arg Asn His Gly Val Pro Gly Met Asp Pro Glu Leu Ala Leu Ala
           3060           3065           3070
Ala Leu Glu Ser Ala Leu Gly Arg Asp Glu Thr Ala Ile Thr Val Ala
    3075           3080           3085
Asp Ile Asp Trp Asp Arg Phe Tyr Leu Ala Tyr Ser Ser Gly Arg Pro
    3090           3095           3100
Gln Pro Leu Val Glu Glu Leu Pro Glu Val Arg Arg Ile Ile Asp Ala
3105           3110           3115           3120
Arg Asp Ser Ala Thr Ser Gly Gln Gly Gly Ser Ser Ala Gln Gly Ala
           3125           3130           3135
Asn Pro Leu Ala Glu Arg Leu Ala Ala Ala Pro Gly Glu Arg Thr
           3140           3145           3150
Glu Ile Leu Leu Gly Leu Val Arg Ala Gln Ala Ala Ala Val Leu Arg
    3155           3160           3165
Met Arg Ser Pro Glu Asp Val Ala Ala Asp Arg Ala Phe Lys Asp Ile
    3170           3175           3180
Gly Phe Asp Ser Leu Ala Gly Val Glu Leu Arg Asn Arg Leu Thr Arg
3185           3190           3195           3200
Ala Thr Gly Leu Gln Leu Pro Ala Thr Leu Val Phe Asp His Pro Thr
           3205           3210           3215
Pro Leu Ala Leu Val Ser Leu Leu Arg Ser Glu Phe Leu Gly Asp Glu
           3220           3225           3230
Glu Thr Ala Asp Ala Arg Arg Ser Ala Ala Leu Pro Ala Thr Val Gly
    3235           3240           3245
Ala Gly Ala Gly Ala Gly Ala Gly Thr Asp Ala Asp Asp Asp Pro Ile
    3250           3255           3260
Ala Ile Val Ala Met Ser Cys Arg Tyr Pro Gly Asp Ile Arg Ser Pro
3265           3270           3275           3280
Glu Asp Leu Trp Arg Met Leu Ser Glu Gly Gly Glu Gly Ile Thr Pro
           3285           3290           3295
Phe Pro Thr Asp Arg Gly Trp Asp Leu Asp Gly Leu Tyr Asp Ala Asp
           3300           3305           3310
Pro Asp Ala Leu Gly Arg Ala Tyr Val Arg Glu Gly Gly Phe Leu His
    3315           3320           3325
Asp Ala Ala Glu Phe Asp Ala Glu Phe Phe Gly Val Ser Pro Arg Glu
    3330           3335           3340
Ala Leu Ala Met Asp Pro Gln Gln Arg Met Leu Leu Thr Thr Ser Trp
3345           3350           3355           3360
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43

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Glu Ala Phe Glu Arg Ala Gly Ile Glu Pro Ala Ser Leu Arg Gly Ser
            3365                3370                3375
Ser Thr Gly Val Phe Ile Gly Leu Ser Tyr Gln Asp Tyr Ala Ala Arg
            3380                3385                3390
Val Pro Asn Ala Pro Arg Gly Val Glu Gly Tyr Leu Leu Thr Gly Ser
            3395                3400                3405
Thr Pro Ser Val Ala Ser Gly Arg Ile Ala Tyr Thr Phe Gly Leu Glu
        3410                3415                3420
Gly Pro Ala Thr Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Thr Ala
3425                3430                3435                3440
Leu His Leu Ala Val Arg Ala Leu Arg Ser Gly Glu Cys Thr Met Ala
            3445                3450                3455
Leu Ala Gly Gly Val Ala Met Met Ala Thr Pro His Met Phe Val Glu
            3460                3465                3470
Phe Ser Arg Gln Arg Ala Leu Ala Pro Asp Gly Arg Ser Lys Ala Phe
            3475                3480                3485
Ser Ala Asp Ala Asp Gly Phe Gly Ala Ala Glu Gly Val Gly Leu Leu
            3490                3495                3500
Leu Val Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His Pro Val Leu
3505                3510                3515                3520
Ala Val Val Arg Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Asn Gly
            3525                3530                3535
Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala
            3540                3545                3550
Leu Ala Asp Ala Arg Leu Ala Pro Gly Asp Ile Asp Ala Val Glu Thr
        3555                3560                3565
His Gly Thr Gly Thr Ser Leu Gly Asp Pro Ile Glu Ala Gln Gly Leu
        3570                3575                3580
Gln Ala Thr Tyr Gly Lys Glu Arg Pro Ala Glu Arg Pro Leu Ala Ile
3585                3590                3595                3600
Gly Ser Val Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Ala
            3605                3610                3615
Ala Gly Ile Ile Lys Met Val Leu Ala Met Arg His Gly Thr Leu Pro
            3620                3625                3630
Lys Thr Leu His Ala Asp Glu Pro Ser Pro His Val Asp Trp Ala Asn
            3635                3640                3645
Ser Gly Leu Ala Leu Val Thr Glu Pro Ile Asp Trp Pro Ala Gly Thr
        3650                3655                3660
Gly Pro Arg Arg Ala Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn
3665                3670                3675                3680
Ala His Val Val Leu Glu Gln Ala Pro Asp Ala Ala Gly Glu Val Leu
            3685                3690                3695
Gly Ala Asp Glu Val Pro Glu Val Ser Glu Thr Val Ala Met Ala Gly
            3700                3705                3710
Thr Ala Gly Thr Ser Glu Val Ala Glu Gly Ser Glu Ala Ser Glu Ala
            3715                3720                3725
Pro Ala Ala Pro Gly Ser Arg Glu Ala Ser Leu Pro Gly His Leu Pro
        3730                3735                3740
Trp Val Leu Ser Ala Lys Asp Glu Gln Ser Leu Arg Gly Gln Ala Ala
3745                .3750                3755                3760
Ala Leu His Ala Trp Leu Ser Glu Pro Ala Ala Asp Leu Ser Asp Ala
            3765                3770                3775
Asp Gly Pro Ala Arg Leu Arg Asp Val Gly Tyr Thr Leu Ala Thr Ser
            3780                3785                3790
Arg Thr Ala Phe Ala His Arg Ala Ala Val Thr Ala Ala Asp Arg Asp
            3795                3800                3805
Gly Phe Leu Asp Gly Leu Ala Thr Leu Ala Gln Gly Gly Thr Ser Ala
        3810                3815                3820
His Val His Leu Asp Thr Ala Arg Asp Gly Thr Thr Ala Phe Leu Phe
3825                3830                3835                3840
Thr Gly Gln Gly Ser Gln Arg Pro Gly Ala Gly Arg Glu Leu Tyr Asp
            3845                3850                3855
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44

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Arg His Pro Val Phe Ala Arg Ala Leu Asp Glu Ile Cys Ala His Leu
          3860                3865                3870
Asp Gly His Leu Glu Leu Pro Leu Leu Asp Val Met Phe Ala Ala Glu
          3875                3880                3885
Gly Ser Ala Glu Ala Ala Leu Leu Asp Glu Thr Arg Tyr Thr Gln Cys
     3890                3895                3900
Ala Leu Phe Ala Leu Glu Val Ala Leu Phe Arg Leu Val Glu Ser Trp
3905                3910                3915                3920
Gly Met Arg Pro Ala Ala Leu Leu Gly His Ser Val Gly Glu Ile Ala
          3925                3930                3935
Ala Ala His Val Ala Gly Val Phe Ser Leu Ala Asp Ala Ala Arg Leu
          3940                3945                3950
Val Ala Ala Arg Gly Arg Leu Met Gln Glu Leu Pro Ala Gly Gly Ala
          3955                3960                3965
Met Leu Ala Val Gln Ala Ala Glu Asp Glu Ile Arg Val Trp Leu Glu
     3970                3975                3980
Thr Glu Glu Arg Tyr Ala Gly Arg Leu Asp Val Ala Ala Val Asn Gly
3985                3990                3995                4000
Pro Glu Ala Ala Val Leu Ser Gly Asp Ala Asp Ala Ala Arg Glu Ala
          4005                4010                4015
Glu Ala Tyr Trp Ser Gly Leu Gly Arg Arg Thr Arg Ala Leu Arg Val
          4020                4025                4030
Ser His Ala Phe His Ser Ala His Met Asp Gly Met Leu Asp Gly Phe
          4035                4040                4045
Arg Ala Val Leu Glu Thr Val Glu Phe Arg Arg Pro Ser Leu Thr Val
     4050                4055                4060
Val Ser Asn Val Thr Gly Leu Ala Ala Gly Pro Asp Asp Leu Cys Asp
4065                4070                4075                4080
Pro Glu Tyr Trp Val Arg His Val Arg Gly Thr Val Arg Phe Leu Asp
          4085                4090                4095
Gly Val Arg Val Leu Arg Asp Leu Gly Val Arg Thr Cys Leu Glu Leu
          4100                4105                4110
Gly Pro Asp Gly Val Leu Thr Ala Met Ala Ala Asp Gly Leu Ala Asp
          4115                4120                4125
Thr Pro Ala Asp Ser Ala Ala Gly Ser Pro Val Gly Ser Pro Ala Gly
     4130                4135                4140
Ser Pro Ala Asp Ser Ala Ala Gly Ala Leu Arg Pro Arg Pro Leu Leu
4145                4150                4155                4160
Val Ala Leu Leu Arg Arg Lys Arg Ser Glu Thr Glu Thr Val Ala Asp
          4165                4170                4175
Ala Leu Gly Arg Ala His Ala His Gly Thr Gly Pro Asp Trp His Ala
          4180                4185                4190
Trp Phe Ala Gly Ser Gly Ala His Arg Val Asp Leu Pro Thr Tyr Ser
     4195                4200                4205
Phe Arg Arg Asp Arg Tyr Trp Leu Asp Ala Pro Ala Ala Asp Thr Ala
     4210                4215                4220
Val Asp Thr Ala Gly Leu Gly Leu Gly Thr Ala Asp His Pro Leu Leu
4225                4230                4235                4240
Gly Ala Val Val Ser Leu Pro Asp Arg Asp Gly Leu Leu Leu Thr Gly
          4245                4250                4255
Arg Leu Ser Leu Arg Thr His Pro Trp Leu Ala Asp His Ala Val Leu
          4260                4265                4270
Gly Ser Val Leu Leu Pro Gly Ala Ala Met Val Glu Leu Ala Ala His
     4275                4280                4285
Ala Ala Glu Ser Ala Gly Leu Arg Asp Val Arg Glu Leu Thr Leu Leu
     4290                4295                4300
Glu Pro Leu Val Leu Pro Glu His Gly Gly Val Glu Leu Arg Val Thr
4305                4310                4315                4320
Val Gly Ala Pro Ala Gly Glu Pro Gly Glu Ser Ala Gly Asp Gly
          4325                4330                4335
Ala Arg Pro Val Ser Leu His Ser Arg Leu Ala Asp Ala Pro Ala Gly
          4340                4345                4350
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45

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Thr Ala Trp Ser Cys His Ala Thr Gly Leu Leu Ala Thr Asp Arg Pro
          4355                4360                4365
Glu Leu Pro Val Ala Pro Asp Arg Ala Ala Met Trp Pro Pro Gln Gly
      4370                4375                4380
Ala Glu Glu Val Pro Leu Asp Gly Leu Tyr Glu Arg Leu Asp Gly Asn
4385                4390                4395                4400
Gly Leu Ala Phe Gly Pro Leu Phe Gln Gly Leu Asn Ala Val Trp Arg
              4405                4410                4415
Tyr Glu Gly Glu Val Phe Ala Asp Ile Ala Leu Pro Ala Thr Thr Asn
          4420                4425                4430
Ala Thr Ala Pro Ala Thr Ala Asn Gly Gly Gly Ser Ala Ala Ala Ala
          4435                4440                4445
Pro Tyr Gly Ile His Pro Ala Leu Leu Asp Ala Ser Leu His Ala Ile
      4450                4455                4460
Ala Val Gly Gly Leu Val Asp Glu Pro Glu Leu Val Arg Val Pro Phe
4465                4470                4475                4480
His Trp Ser Gly Val Thr Val His Ala Ala Gly Ala Ala Ala Ala Arg
              4485                4490                4495
Val Arg Leu Ala Ser Ala Gly Thr Asp Ala Val Ser Leu Ser Leu Thr
          4500                4505                4510
Asp Gly Glu Gly Arg Pro Leu Val Ser Val Glu Arg Leu Thr Leu Arg
          4515                4520                4525
Pro Val Thr Ala Asp Gln Ala Ala Ala Ser Arg Val Gly Gly Leu Met
      4530                4535                4540
His Arg Val Ala Trp Arg Pro Tyr Ala Leu Ala Ser Ser Gly Glu Gln
4545                4550                4555                4560
Asp Pro His Ala Thr Ser Tyr Gly Pro Thr Ala Val Leu Gly Lys Asp
          4565                4570                4575
Glu Leu Lys Val Ala Ala Ala Leu Glu Ser Ala Gly Val Glu Val Gly
          4580                4585                4590
Leu Tyr Pro Asp Leu Ala Ala Leu Ser Gln Asp Val Ala Ala Gly Ala
      4595                4600                4605
Pro Ala Pro Arg Thr Val Leu Ala Pro Leu Pro Ala Gly Pro Ala Asp
      4610                4615                4620
Gly Gly Ala Glu Gly Val Arg Gly Thr Val Ala Arg Thr Leu Glu Leu
4625                4630                4635                4640
Leu Gln Ala Trp Leu Ala Asp Glu His Leu Ala Gly Thr Arg Leu Leu
              4645          ˙     4650                4655
Leu Val Thr Arg Gly Ala Val Arg Asp Pro Glu Gly Ser Gly Ala Asp
          4660                4665                4670
Asp Gly Gly Glu Asp Leu Ser His Ala Ala Ala Trp Gly Leu Val Arg
      4675                4680                4685
Thr Ala Gln Thr Glu Asn Pro Gly Arg Phe Gly Leu Leu Asp Leu Ala
      4690                4695                4700
Asp Asp Ala Ser Ser Tyr Arg Thr Leu Pro Ser Val Leu Ser Asp Ala
4705                4710                4715                4720
Gly Leu Arg Asp Glu Pro Gln Leu Ala Leu His Asp Gly Thr Ile Arg
          4725                4730                4735
Leu Ala Arg Leu Ala Ser Val Arg Pro Glu Thr Gly Thr Ala Ala Pro
          4740                4745                4750
Ala Leu Ala Pro Glu Gly Thr Val Leu Leu Thr Gly Gly Thr Gly Gly
          4755                4760                4765
Leu Gly Gly Leu Val Ala Arg His Val Val Gly Glu Trp Gly Val Arg
      4770                4775                4780
Arg Leu Leu Leu Val Ser Arg Arg Gly Thr Asp Ala Pro Gly Ala Asp
4785                4790                4795                4800
Glu Leu Val His Glu Leu Glu Ala Leu Gly Ala Asp Val Ser Val Ala
          4805                4810                4815
Ala Cys Asp Val Ala Asp Arg Glu Ala Leu Thr Ala Val Leu Asp Ala
          4820                4825                4830
Ile Pro Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val
      4835                4840                4845
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46

Leu Ser Asp Gly Thr Leu Pro Ser Met Thr Thr Glu Asp Val Glu His
    4850   4855   4860
Val Leu Arg Pro Lys Val Asp Ala Ala Phe Leu Leu Asp Glu Leu Thr
4865   4870   4875   4880
Ser Thr Pro Ala Tyr Asp Leu Ala Ala Phe Val Met Phe Ser Ser Ala
              4885   4890   4895
Ala Ala Val Phe Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Ala Asn
          4900   4905   4910
Ala Thr Leu Asp Ala Leu Ala Trp Arg Arg Arg Ala Ala Gly Leu Pro
          4915   4920   4925
Ala Leu Ser Leu Gly Trp Gly Leu Trp Ala Glu Thr Ser Gly Met Thr
          4930   4935   4940
Gly Glu Leu Gly Gln Ala Asp Leu Arg Arg Met Ser Arg Ala Gly Ile
4945   4950   4955   4960
Gly Gly Ile Ser Asp Ala Glu Gly Ile Ala Leu Leu Asp Ala Ala Leu
              4965 .   4970   4975
Arg Asp Asp Arg His Pro Val Leu Leu Pro Leu Arg Leu Asp Ala Ala
              4980   4985   4990
Gly Leu Arg Asp Ala Ala Gly Asn Asp Pro Ala Gly Ile Pro Ala Leu
          4995   5000   5005
Phe Arg Asp Val Val Gly Ala Arg Thr Val Arg Ala Arg Pro Ser Ala
    5010   5015   5020
Ala Ser Ala Ser Thr Thr Ala Gly Thr Ala Gly Thr Pro Gly Thr Ala
5025   5030   5035   5040
Asp Gly Ala Ala Glu Thr Ala Ala Val Thr Leu Ala Asp Arg Ala Ala
              5045   5050   5055
Thr Val Asp Gly Pro Ala Arg Gln Arg Leu Leu Leu Glu Phe Val Val
              5060   5065   5070
Gly Glu Val Ala Glu Val Leu Gly His Ala Arg Gly His Arg Ile Asp
          5075   5080   5085
Ala Glu Arg Gly Phe Leu Asp Leu Gly Phe Asp Ser Leu Thr Ala Val
    5090   5095   5100
Glu Leu Arg Asn Arg Leu Asn Ser Ala Gly Gly Leu Ala Leu Pro Ala
5105   5110   5115   5120
Thr Leu Val Phe Asp His Pro Ser Pro Ala Ala Leu Ala Ser His Leu
              5125   5130   5135
Asp Ala Glu Leu Pro Arg Gly Ala Ser Asp Gln Asp Gly Ala Gly Asn
          5140   5145   5150
Arg Asn Gly Asn Glu Asn Gly Thr Thr Ala Ser Arg Ser Thr Ala Glu
    5155   5160   5165
Thr Asp Ala Leu Leu Ala Gln Leu Thr Arg Leu Glu Gly Ala Leu Val
5170   5175   5180
Leu Thr Gly Leu Ser Asp Ala Pro Gly Ser Glu Glu Val Leu Glu His
5185   5190   5195   5200
Leu Arg Ser Leu Arg Ser Met Val Thr Gly Glu Thr Gly Thr Gly Thr
          5205   5210   5215
Ala Ser Gly Ala Pro Asp Gly Ala Gly Ser Gly Ala Glu Asp Arg Pro
    5220   5225   5230
Trp Ala Ala Gly Asp Gly Ala Gly Gly Gly Ser Glu Asp Gly Ala Gly
          5235   5240   5245
Val Pro Asp Phe Met Asn Ala Ser Ala Glu Glu Leu Phe Gly Leu Leu
    5250   5255   5260
Asp Gln Asp Pro Ser Thr Asp Met Ser Thr Val Asn Glu Glu Lys Tyr
5265   5270   5275   5280
Leu Asp Tyr Leu Arg Arg Ala Thr Ala Asp Leu His Glu Ala Arg Gly
          5285   5290   5295
Arg Leu Arg Glu Leu Glu Ala Lys Ala Gly Glu Pro Val Ala Ile Val
          5300   5305   5310
Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Glu Asp Leu
    5315   5320   5325
Trp Arg Leu Val Ala Gly Gly Glu Asp Ala Ile Ser Glu Phe Pro Gln
    5330   5335   5340

47

Asp Arg Gly Trp Asp Val Glu Gly Leu Tyr Asp Pro Asn Pro Glu Ala
5345   5350   5355   5360
Thr Gly Lys Ser Tyr Ala Arg Glu Ala Gly Phe Leu Tyr Glu Ala Gly
          5365   5370   5375
Glu Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala
          5380   5385   5390
Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Ala Ser Trp Glu Ala Phe
          5395   5400   5405
Glu His Ala Gly Ile Pro Ala Ala Thr Ala Arg Gly Thr Ser Val Gly
          5410   5415   5420
Val Phe Thr Gly Val Met Tyr His Asp Tyr Ala Thr Arg Leu Thr Asp
5425   5430   5435   5440
Val Pro Glu Gly Ile Glu Gly Tyr Leu Gly Thr Gly Asn Ser Gly Ser
          5445   5450   5455
Val Ala Ser Gly Arg Val Ala Tyr Thr Leu Gly Leu Glu Gly Pro Ala
          5460   5465   5470
Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
          5475   5480   5485
Ala Val Gln Ala Leu Arg Lys Gly Glu Val Asp Met Ala Leu Ala Gly
          5490   5495   5500
Gly Val Thr Val Met Ser Thr Pro Ser Thr Phe Val Glu Phe Ser Arg
5505   5510   5515   5520
Gln Arg Gly Leu Ala Pro Asp Gly Arg Ser Lys Ser Phe Ser Ser Thr
          5525   5530   5535
Ala Asp Gly Thr Ser Trp Ser Glu Gly Val Gly Val Leu Leu Val Glu
          5540   5545   5550
Arg Leu Ser Asp Ala Arg Arg Lys Gly His Arg Ile Leu Ala Val Val
          5555   5560   5565
Arg Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Ser Gly Leu Thr Ala
5570   5575   5580
Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp
5585   5590   5595   5600
Ala Arg Leu Thr Thr Ser Asp Val Asp Val Val Glu Ala His Gly Thr
          5605   5610   5615
Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Val Ile Ala Thr
          5620   5625   5630
Tyr Gly Gln Gly Arg Asp Gly Glu Gln Pro Leu Arg Leu Gly Ser Leu
          5635   5640   5645
Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ser Gly Val
          5650   5655   5660
Ile Lys Met Val Gln Ala Met Arg His Gly Val Leu Pro Lys Thr Leu
5665   5670   5675   5680
His Val Glu Lys Pro Thr Asp Gln Val Asp Trp Ser Ala Gly Ala Val
          5685   5690   5695
Glu Leu Leu Thr Glu Ala Met Asp Trp Pro Asp Lys Gly Asp Gly Gly
          5700   5705   5710
Leu Arg Arg Ala Ala Val Ser Ser Phe Gly Val Ser Gly Thr Asn Ala
          5715   5720   5725
His Val Val Leu Glu Glu Ala Pro Ala Ala Glu Glu Thr Pro Ala Ser
          5730   5735   5740
Glu Ala Thr Pro Ala Val Glu Pro Ser Val Gly Ala Gly Leu Val Pro
5745   5750   5755   5760
Trp Leu Val Ser Ala Lys Thr Pro Ala Ala Leu Asp Ala Gln Ile Gly
          5765   5770   5775
Arg Leu Ala Ala Phe Ala Ser Gln Gly Arg Thr Asp Ala Ala Asp Pro
          5780   5785   5790
Gly Ala Val Ala Arg Val Leu Ala Gly Gly Arg Ala Glu Phe Glu His
          5795   5800   5805
Arg Ala Val Val Leu Gly Thr Gly Gln Asp Asp Phe Ala Gln Ala Leu
          5810   5815   5820
Thr Ala Pro Glu Gly Leu Ile Arg Gly Thr Pro Ser Asp Val Gly Arg
5825   5830   5835   5840

48

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Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly
            5845                    5850                    5855
Ala Glu Leu Leu Asp Val Ser Lys Glu Phe Ala Ala Ala Met Ala Glu
            5860                    5865                    5870
Cys Glu Ser Ala Leu Ser Arg Tyr Val Asp Trp Ser Leu Glu Ala Val
            5875                    5880                    5885
Val Arg Gln Ala Pro Gly Ala Pro Thr Leu Glu Arg Val Asp Val Val
            5890                    5895                    5900
Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val Trp Gln
5905                    5910                    5915                    5920
His His Gly Val Thr Pro Gln Ala Val Val Gly His Ser Gln Gly Glu
            5925                    5930                    5935
Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala
            5940                    5945                    5950
Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly
            5955                    5960                    5965
Lys Gly Gly Met Ile Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln
            5970                    5975                    5980
Arg Ile Glu Asn Leu His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro
5985                    5990                    5995                    6000
Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala
            6005                    6010                    6015
Gln Ala Cys Glu Ala Asp Gly Val Arg Ala Arg Ile Ile Pro Val Asp
            6020                    6025                    6030
Tyr Ala Ser His Ser Ala His Val Glu Thr Ile Glu Ser Glu Leu Ala
            6035                    6040                    6045
Glu Val Leu Ala Gly Leu Ser Pro Arg Thr Pro Glu Val Pro Phe Phe
            6050                    6055                    6060
Ser Thr Leu Glu Gly Ala Trp Ile Thr Glu Pro Val Leu Asp Gly Thr
6065                    6070                    6075                    6080
Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala Val
            6085                    6090                    6095
Glu Thr Leu Ala Thr Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser
            6100                    6105                    6110
Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly Leu
            6115                    6120                    6125
Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu Val Thr Ser
6130                    6135                    6140
Leu Ala Glu Ala Trp Thr Asn Gly Leu Thr Ile Asp Trp Ala Pro Val
6145                    6150                    6155                    6160
Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr Tyr Ala Phe
            6165                    6170                    6175
Gln Arg Arg His Tyr Trp Leu His Asp Ser Pro Ala Val Gln Gly Ser
            6180                    6185                    6190
Val Gln Asp Ser Trp Arg Tyr Arg Ile Asp Trp Lys Arg Leu Ala Val
            6195                    6200                    6205
Ala Asp Ala Ser Glu Arg Ala Gly Leu Ser Gly Arg Trp Leu Val Val
            6210                    6215                    6220
Val Pro Glu Asp Arg Ser Ala Glu Ala Ala Pro Val Leu Ala Ala Leu
6225                    6230                    6235                    6240
Ser Gly Ala Gly Ala Asp Pro Val Gln Leu Asp Val Ser Pro Leu Gly
            6245                    6250                    6255
Asp Arg Gln Arg Leu Ala Ala Thr Leu Gly Glu Ala Leu Ala Ala Ala
            6260                    6265                    6270
Gly Gly Ala Val Asp Gly Val Leu Ser Leu Leu Ala Trp Asp Glu Ser
            6275                    6280                    6285
Ala His Pro Gly His Pro Ala Pro Phe Thr Arg Gly Thr Gly Ala Thr
            6290                    6295                    6300
Leu Thr Leu Val Gln Ala Leu Glu Asp Ala Gly Val Ala Ala Pro Leu
6305                    6310                    6315                    6320
Trp Cys Val Thr His Gly Ala Val Ser Val Gly Arg Ala Asp His Val
            6325                    6330                    6335
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49

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Thr Ser Pro Ala Gln Ala Met Val Trp Gly Met Gly Arg Val Ala Ala
            6340                6345                6350
Leu Glu His Pro Glu Arg Trp Gly Gly Leu Ile Asp Leu Pro Ser Asp
            6355                6360                6365
Ala Asp Arg Ala Ala Leu Asp Arg Met Thr Thr Val Leu Ala Gly Gly
        6370                6375                6380
Thr Gly Glu Asp Gln Val Ala Val Arg Ala Ser Gly Leu Leu Ala Arg
6385                6390                6395                6400
Arg Leu Val Arg Ala Ser Leu Pro Ala His Gly Thr Ala Ser Pro Trp
            6405                6410                6415
Trp Gln Ala Asp Gly Thr Val Leu Val Thr Gly Ala Glu Glu Pro Ala
            6420                6425                6430
Ala Ala Glu Ala Ala Arg Arg Leu Ala Arg Asp Gly Ala Gly His Leu
            6435                6440                6445
Leu Leu His Thr Thr Pro Ser Gly Ser Glu Gly Ala Glu Gly Thr Ser
        6450                6455                6460
Gly Ala Ala Glu Asp Ser Gly Leu Ala Gly Leu Val Ala Glu Leu Ala
6465                6470                6475                6480
Asp Leu Gly Ala Thr Ala Thr Val Val Thr Cys Asp Leu Thr Asp Ala
            6485                6490                6495
Glu Ala Ala Ala Arg Leu Leu Ala Gly Val Ser Asp Ala His Pro Leu
        6500                6505                6510
Ser Ala Val Leu His Leu Pro Pro Thr Val Asp Ser Glu Pro Leu Ala
            6515                6520                6525
Ala Thr Asp Ala Asp Ala Leu Ala Arg Val Val Thr Ala Lys Ala Thr
        6530                6535                6540
Ala Ala Leu His Leu Asp Arg Leu Leu Arg Glu Ala Ala Ala Ala Gly
6545                6550                6555                6560
Gly Arg Pro Pro Val Leu Val Leu Phe Ser Ser Val Ala Ala Ile Trp
            6565                6570                6575
Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Gly Thr Ala Phe Leu Asp
        6580                6585                6590
Ala Leu Ala Gly Gln His Arg Ala Asp Gly Pro Thr Val Thr Ser Val
        6595                6600                6605
Ala Trp Ser Pro Trp Glu Gly Ser Arg Val Thr Glu Gly Ala Thr Gly
        6610                6615                6620
Glu Arg Leu Arg Arg Leu Gly Leu Arg Pro Leu Ala Pro Ala Thr Ala
6625                6630                6635                6640
Leu Thr Ala Leu Asp Thr Ala Leu Gly His Gly Asp Thr Ala Val Thr
            6645                6650                6655
Ile Ala Asp Val Asp Trp Ser Ser Phe Ala Pro Gly Phe Thr Thr Ala
        6660                6665                6670
Arg Pro Gly Thr Leu Leu Ala Asp Leu Pro Glu Ala Arg Arg Ala Leu
        6675                6680                6685
Asp Glu Gln Gln Ser Thr Thr Ala Ala Asp Asp Thr Val Leu Ser Arg
        6690                6695                6700
Glu Leu Gly Ala Leu Thr Gly Ala Glu Gln Gln Arg Arg Met Gln Glu
6705                6710                6715                6720
Leu Val Arg Glu His Leu Ala Val Val Leu Asn His Pro Ser Pro Glu
            6725                6730                6735
Ala Val Asp Thr Gly Arg Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu
            6740                6745                6750
Thr Ala Val Glu Leu Arg Asn Arg Leu Lys Asn Ala Thr Gly Leu Ala
            6755                6760                6765
Leu Pro Ala Thr Leu Val Phe Asp Tyr Pro Thr Pro Arg Thr Leu Ala
        6770                6775                6780
Glu Phe Leu Leu Ala Glu Ile Leu Gly Glu Gln Ala Gly Ala Gly Glu
6785                6790                6795                6800
Gln Leu Pro Val Asp Gly Gly Val Asp Asp Glu Pro Val Ala Ile Val
            6805                6810                6815
Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Glu Asp Leu
            6820                6825                6830
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50

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Trp Arg Leu Val Ala Gly Gly Glu Asp Ala Ile Ser Gly Phe Pro Gln
        6835                6840                6845
Asp Arg Gly Trp Asp Val Glu Gly Leu Tyr Asp Pro Asp Pro Asp Ala
        6850                6855                6860
Ser Gly Arg Thr Tyr Cys Arg Ala Gly Gly Phe Leu Asp Glu Ala Gly
6865                6870                6875                6880
Glu Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala
                6885                6890                6895
Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Val
        6900                6905                6910
Glu Asp Ala Gly Ile Asp Pro Thr Ser Leu Gln Gly Gln Gln Val Gly
        6915                6920                6925
Val Phe Ala Gly Thr Asn Gly Pro His Tyr Glu Pro Leu Leu Arg Asn
        6930                6935                6940
Thr Ala Glu Asp Leu Glu Gly Tyr Val Gly Thr Gly Asn Ala Ala Ser
6945                6950                6955                6960
Ile Met Ser Gly Arg Val Ser Tyr Thr Leu Gly Leu Glu Gly Pro Ala
                6965                6970                6975
Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
        6980                6985                6990
Ala Val Gln Ala Leu Arg Lys Gly Glu Cys Gly Leu Ala Leu Ala Gly
        6995                7000                7005
Gly Val Thr Val Met Ser Thr Pro Thr Thr Phe Val Glu Phe Ser Arg
        7010                7015                7020
Gln Arg Gly Leu Ala Glu Asp Gly Arg Ser Lys Ala Phe Ala Ala Ser
7025                7030                7035                7040
Ala Asp Gly Phe Gly Pro Ala Glu Gly Val Gly Met Leu Leu Val Glu
                7045                7050                7055
Arg Leu Ser Asp Ala Arg Arg Asn Gly His Arg Val Leu Ala Val Val
                7060                7065                7070
Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala
        7075                7080                7085
Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp
        7090                7095                7100
Ala Arg Leu Thr Thr Ala Asp Val Asp Val Val Glu Ala His Gly Thr
7105                7110                7115                7120
Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr
                7125                7130                7135
Tyr Gly Gln Gly Arg Asp Thr Glu Gln Pro Leu Arg Leu Gly Ser Leu
        7140                7145                7150
Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ser Gly Ile
        7155                7160                7165
Ile Lys Met Val Gln Ala Met Arg His Gly Val Leu Pro Lys Thr Leu
7170                7175                7180
His Val Asp Arg Pro Ser Asp Gln Ile Asp Trp Ser Ala Gly Thr Val
7185                7190                7195                7200
Glu Leu Leu Thr Glu Ala Met Asp Trp Pro Arg Lys Gln Glu Gly Gly
        7205                7210                7215
Leu Arg Arg Ala Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala
        7220                7225                7230
His Ile Val Leu Glu Glu Ala Pro Val Asp Glu Asp Ala Pro Ala Asp
        7235                7240                7245
Glu Pro Ser Val Gly Gly Val Val Pro Trp Leu Val Ser Ala Lys Thr
7250                7255                7260
Pro Ala Ala Leu Asp Ala Gln Ile Gly Arg Leu Ala Ala Phe Ala Ser
7265                7270                7275                7280
Gln Gly Arg Thr Asp Ala Ala Asp Pro Gly Ala Val Ala Arg Val Leu
        7285                7290                7295
Ala Gly Gly Arg Ala Gln Phe Glu His Arg Ala Val Ala Leu Gly Thr
        7300                7305                7310
Gly Gln Asp Asp Leu Ala Ala Ala Leu Ala Ala Pro Glu Gly Leu Val
        7315                7320                7325
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51

Arg Gly Val Ala Ser Gly Val Gly Arg Val Ala Phe Val Phe Pro Gly
     7330   7335   7340
Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp Val Ser
7345   7350   7355   7360
Lys Glu Phe Ala Ala Ala Met Ala Glu Cys Glu Ala Ala Leu Ala Pro
              7365   7370   7375
Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro Gly Ala
              7380   7385   7390
Pro Thr Leu Glu Arg Val Asp Val Val Gln Pro Val Thr Phe Ala Val
         7395   7400   7405
Met Val Ser Leu Ala Lys Val Trp Gln His His Gly Val Thr Pro Gln
     7410   7415   7420
Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala
7425   7430   7435   7440
Gly Ala Leu Ser Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser
              7445   7450   7455
Lys Ser Ile Gly Ala His Leu Ala Gly Gln Gly Gly Met Leu Ser Leu
              7460   7465   7470
Ala Leu Ser Glu Ala Ala Val Val Glu Arg Leu Ala Gly Phe Asp Gly
         7475   7480   7485
Leu Ser Val Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly
     7490   7495   7500
Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala Asp Gly
7505   7510   7515   7520
Val Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser Ala His
              7525   7530   7535
Val Glu Thr Ile Glu Ser Glu Leu Ala Asp Val Leu Ala Gly Leu Ser
              7540   7545   7550
Pro Gln Thr Pro Gln Val Pro Phe Ser Thr Leu Glu Gly Ala Trp
         7555   7560   7565
Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg
     7570   7575   7580
His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu
7585   7590   7595   7600
Gly Phe Thr His Phe Val Glu Val Ser Ala His Pro Val Leu Thr Met
              7605   7610   7615
Ala Leu Pro Glu Thr Val Thr Gly Leu Gly Thr Leu Arg Arg Asp Asn
         7620   7625   7630
Gly Gly Gln His Arg Leu Thr Thr Ser Leu Ala Glu Ala Trp Ala Asn
     7635   7640   7645
Gly Leu Thr Val Asp Trp Ala Ser Leu Leu Pro Thr Thr Thr Thr His
7650   7655   7660
Pro Asp Leu Pro Thr Tyr Ala Phe Gln Thr Glu Arg Tyr Trp Pro Gln
7665   7670   7675   7680
Pro Asp Leu Ser Ala Ala Gly Asp Ile Thr Ser Ala Gly Leu Gly Ala
              7685   7690   7695
Ala Glu His Pro Leu Leu Gly Ala Ala Val Ala Leu Ala Asp Ser Asp
         7700   7705   7710
Gly Cys Leu Leu Thr Gly Ser Leu Ser Leu Arg Thr His Pro Trp Leu
     7715   7720   7725
Ala Asp His Ala Val Ala Gly Thr Val Leu Leu Pro Gly Thr Ala Phe
     7730   7735   7740
Val Glu Leu Ala Phe Arg Ala Gly Asp Gln Val Gly Cys Asp Leu Val
7745   7750   7755   7760
Glu Glu Leu Thr Leu Asp Ala Pro Leu Val Leu Pro Arg Arg Gly Ala
              7765   7770   7775
Val Arg Val Gln Leu Ser Val Gly Ala Ser Asp Glu Ser Gly Arg Arg
              7780   7785   7790
Thr Phe Gly Leu Tyr Ala His Pro Glu Asp Ala Pro Gly Glu Ala Glu
         7795   7800   7805
Trp Thr Arg His Ala Thr Gly Val Leu Ala Ala Arg Ala Asp Arg Thr
     7810   7815   7820

52

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Ala Pro Val Ala Asp Pro Glu Ala Trp Pro Pro Pro Gly Ala Glu Pro
7825             7830             7835                     7840
Val Asp Val Asp Gly Leu Tyr Glu Arg Phe Ala Ala Asn Gly Tyr Gly
                7845             7850             7855
Tyr Gly Pro Leu Phe Gln Gly Val Arg Gly Val Trp Arg Arg Gly Asp
            7860             7865             7870
Glu Val Phe Ala Asp Val Ala Leu Pro Ala Glu Val Ala Gly Ala Glu
            7875             7880             7885
Gly Ala Arg Phe Gly Leu His Pro Ala Leu Leu Asp Ala Ala Val Gln
        7890             7895             7900
Ala Ala Gly Ala Gly Arg Gly Val Arg Arg Gly His Ala Ala Ala Val
7905             7910             7915                     7920
Arg Leu Glu Arg Asp Leu Leu Tyr Ala Val Gly Ala Thr Ala Leu Arg
                7925             7930             7935
Val Arg Leu Ala Pro Ala Gly Pro Asp Thr Val Ser Val Ser Ala Ala
            7940             7945             7950
Asp Ser Ser Gly Gln Pro Val Phe Ala Ala Asp Ser Leu Thr Val Leu
            7955             7960             7965
Pro Val Asp Pro Ala Gln Leu Ala Ala Phe Ser Asp Pro Thr Leu Asp
        7970             7975             7980
Ala Leu His Leu Leu Glu Trp Thr Ala Trp Asp Gly Ala Ala Gln Ala
7985             7990             7995                     8000
Leu Pro Gly Ala Val Val Leu Gly Gly Asp Ala Asp Gly Leu Ala Ala
            8005             8010             8015
Ala Leu Arg Ala Gly Gly Thr Glu Val Leu Ser Phe Pro Asp Leu Thr
        8020             8025             8030
Asp Leu Val Glu Ala Val Asp Arg Gly Glu Thr Pro Ala Pro Ala Thr
        8035             8040             8045
Val Leu Val Ala Cys Pro Ala Ala Gly Pro Asp Gly Pro Glu His Val
    8050             8055             8060
Arg Glu Ala Leu His Gly Ser Leu Ala Leu Met Gln Ala Trp Leu Ala
8065             8070             8075                     8080
Asp Glu Arg Phe Thr Asp Gly Arg Leu Val Leu Val Thr Arg Asp Ala
            8085             8090             8095
Val Ala Ala Arg Ser Gly Asp Gly Leu Arg Ser Thr Gly Gln Ala Ala
            8100             8105             8110
Val Trp Gly Leu Gly Arg Ser Ala Gln Thr Glu Ser Pro Gly Arg Phe
    8115             8120             8125
Val Leu Leu Asp Leu Ala Gly Glu Ala Arg Thr Ala Gly Asp Ala Thr
    8130             8135             8140
Ala Gly Asp Gly Leu Thr Thr Gly Asp Ala Thr Val Gly Gly Thr Ser
8145             8150             8155                     8160
Gly Asp Ala Ala Leu Gly Ser Ala Leu Ala Thr Ala Leu Gly Ser Gly
            8165             8170             8175
Glu Pro Gln Leu Ala Leu Arg Asp Gly Ala Leu Leu Val Pro Arg Leu
        8180             8185             8190
Ala Arg Ala Ala Ala Pro Ala Ala Ala Asp Gly Leu Ala Ala Ala Asp
        8195             8200             8205
Gly Leu Ala Ala Leu Pro Leu Pro Ala Ala Pro Ala Leu Trp Arg Leu
    8210             8215             8220
Glu Pro Gly Thr Asp Gly Ser Leu Glu Ser Leu Thr Ala Ala Pro Gly
8225             8230             8235                     8240
Asp Ala Glu Thr Leu Ala Pro Glu Pro Leu Gly Pro Gly Gln Val Arg
            8245             8250             8255
Ile Ala Ile Arg Ala Thr Gly Leu Asn Phe Arg Asp Val Leu Ile Ala
            8260             8265             8270
Leu Gly Met Tyr Pro Asp Pro Ala Leu Met Gly Thr Glu Gly Ala Gly
        8275             8280             8285
Val Val Thr Ala Thr Gly Pro Gly Val Thr His Leu Ala Pro Gly Asp
    8290             8295             8300
Arg Val Met Gly Leu Leu Ser Gly Ala Tyr Ala Pro Val Val Val Ala
8305             8310             8315                     8320


                               53
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Asp Ala Arg Thr Val Ala Arg Met Pro Glu Gly Trp Thr Phe Ala Gln
            8325                8330                8335
Gly Ala Ser Val Pro Val Val Phe Leu Thr Ala Val Tyr Ala Leu Arg
            8340                8345                8350
Asp Leu Ala Asp Val Lys Pro Gly Glu Arg Leu Leu Val His Ser Ala
            8355                8360                8365
Ala Gly Gly Val Gly Met Ala Ala Val Gln Leu Ala Arg His Trp Gly
        8370                8375                8380
Val Glu Val His Gly Thr Ala Ser His Gly Lys Trp Asp Ala Leu Arg
8385                8390                8395                8400
Ala Leu Gly Leu Asp Asp Ala His Ile Ala Ser Ser Arg Thr Leu Asp
            8405                8410                8415
Phe Glu Ser Ala Phe Arg Ala Ala Ser Gly Gly Ala Gly Met Asp Val
            8420                8425                8430
Val Leu Asn Ser Leu Ala Arg Glu Phe Val Asp Ala Ser Leu Arg Leu
            8435                8440                8445
Leu Gly Pro Gly Gly Arg Phe Val Glu Met Gly Lys Thr Asp Val Arg
            8450                8455                8460
Asp Ala Glu Arg Val Ala Ala Asp His Pro Gly Val Gly Tyr Arg Ala
8465                8470                8475                8480
Phe Asp Leu Gly Glu Ala Gly Pro Glu Arg Ile Gly Glu Met Leu Ala
            8485                8490                8495
Glu Val Ile Ala Leu Phe Glu Asp Gly Val Leu Arg His Leu Pro Val
            8500                8505                8510
Thr Thr Trp Asp Val Arg Arg Ala Arg Asp Ala Phe Arg His Val Ser
            8515                8520                8525
Gln Ala Arg His Thr Gly Lys Val Val Leu Thr Met Pro Ser Gly Leu
            8530                8535                8540
Asp Pro Glu Gly Thr Val Leu Leu Thr Gly Gly Thr Gly Ala Leu Gly
8545                8550                8555                8560
Gly Ile Val Ala Arg His Val Val Gly Glu Trp Gly Val Arg Arg Leu
            8565                8570                8575
Leu Leu Val Ser Arg Arg Gly Thr Asp Ala Pro Gly Ala Gly Glu Leu
            8580                8585                8590
Val His Glu Leu Glu Ala Leu Gly Ala Asp Val Ser Val Ala Ala Cys
        8595                8600                8605
Asp Val Ala Asp Arg Glu Ala Leu Thr Ala Val Leu Asp Ser Ile Pro
        8610                8615                8620
Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val Leu Ser
8625                8630                8635                8640
Asp Gly Thr Leu Pro Ser Met Thr Ala Glu Asp Val Glu His Val Leu
            8645                8650                8655
Arg Pro Lys Val Asp Ala Ala Phe Leu Leu Asp Glu Leu Thr Ser Thr
            8660                8665                8670
Pro Gly Tyr Asp Leu Ala Ala Phe Val Met Phe Ser Ser Ala Ala Ala
        8675                8680                8685
Val Phe Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Ala Asn Ala Thr
        8690                8695                8700
Leu Asp Ala Leu Ala Trp Arg Arg Arg Thr Ala Gly Leu Pro Ala Leu
8705                8710                8715                8720
Ser Leu Gly Trp Gly Leu Trp Ala Glu Thr Ser Gly Met Thr Gly Gly
            8725                8730                8735
Leu Ser Asp Thr Asp Arg Ser Arg Leu Ala Arg Ser Gly Ala Thr Pro
            8740                8745                8750
Met Asp Ser Glu Leu Thr Leu Ser Leu Leu Asp Ala Ala Met Arg Arg
        8755                8760                8765
Asp Asp Pro Ala Leu Val Pro Ile Ala Leu Asp Val Ala Ala Leu Arg
        8770                8775                8780
Ala Gln Gln Arg Asp Gly Met Leu Ala Pro Leu Leu Ser Gly Leu Thr
8785                8790                8795                8800
Arg Gly Ser Arg Val Gly Gly Ala Pro Val Asn Gln Arg Arg Ala Ala
            8805                8810                8815
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54

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Ala Gly Gly Ala Gly Glu Ala Asp Thr Asp Leu Gly Gly Arg Leu Ala
          8820                8825              8830
Ala Met Thr Pro Asp Asp Arg Val Ala His Leu Arg Asp Leu Val Arg
          8835                8840              8845
Thr His Val Ala Thr Val Leu Gly His Gly Thr Pro Ser Arg Val Asp
          8850                8855              8860
Leu Glu Arg Ala Phe Arg Asp Thr Gly Phe Asp Ser Leu Thr Ala Val
8865                8870              8875                8880
Glu Leu Arg Asn Arg Leu Asn Ala Ala Thr Gly Leu Arg Leu Pro Ala
          8885                8890              8895
Thr Leu Val Phe Asp His Pro Thr Pro Gly Glu Leu Ala Gly His Leu
          8900                8905              8910
Leu Asp Glu Leu Ala Thr Ala Ala Gly Gly Ser Trp Ala Glu Gly Thr
          8915                8920              8925
Gly Ser Gly Asp Thr Ala Ser Ala Thr Asp Arg Gln Thr Thr Ala Ala
          8930                8935              8940
Leu Ala Glu Leu Asp Arg Leu Glu Gly Val Leu Ala Ser Leu Ala Pro
8945                8950              8955                8960
Ala Ala Gly Gly Arg Pro Glu Leu Ala Ala Arg Leu Arg Ala Leu Ala
          8965                8970              8975
Ala Ala Leu Gly Asp Asp Gly Asp Asp Ala Thr Asp Leu Asp Glu Ala
          8980                8985              8990
Ser Asp Asp Asp Leu Phe Ser Phe Ile Asp Lys Glu Leu Gly Asp Ser
          8995                9000              9005
Asp Phe Met Ala Asn Asn Glu Asp Lys Leu Arg Asp Tyr Leu Lys Arg
          9010                9015              9020
Val Thr Ala Glu Leu Gln Gln Asn Thr Arg Arg Leu Arg Glu Ile Glu
9025                9030              9035                9040
Gly Arg Thr His Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu
          9045                9050              9055
Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Gln Leu Val Ala Gly
          9060                9065              9070
Asp Gly Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val
          9075                9080              9085
Glu Gly Leu Tyr Asp Pro Asp Pro Asp Ala Ser Gly Arg Thr Tyr Cys
          9090                9095              9100
Arg Ser Gly Gly Phe Leu His Asp Ala Gly Glu Phe Asp Ala Asp Phe
9105                9110              9115                9120
Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg
          9125                9130              9135
Leu Ser Leu Thr Thr Ala Trp Glu Ala Ile Glu Ser Ala Gly Ile Asp
          9140                9145              9150
Pro Thr Ala Leu Lys Gly Ser Gly Leu Gly Val Phe Val Gly Gly Trp
          9155                9160              9165
His Thr Gly Tyr Thr Ser Gly Gln Thr Thr Ala Val Gln Ser Pro Glu
9170                9175              9180
Leu Glu Gly His Leu Val Ser Gly Ala Ala Leu Gly Phe Leu Ser Gly
9185                9190              9195                9200
Arg Ile Ala Tyr Val Leu Gly Thr Asp Gly Pro Ala Leu Thr Val Asp
          9205                9210              9215
Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala
          9220                9225              9230
Leu Arg Lys Gly Glu Cys Asp Met Ala Leu Ala Gly Gly Val Thr Val
          9235                9240              9245
Met Pro Asn Ala Asp Leu Phe Val Gln Phe Ser Arg Gln Arg Gly Leu
          9250                9255              9260
Ala Ala Asp Gly Arg Ser Lys Ala Phe Ala Thr Ser Ala Asp Gly Phe
9265                9270              9275                9280
Gly Pro Ala Glu Gly Ala Gly Val Leu Leu Val Glu Arg Leu Ser Asp
          9285                9290              9295
Ala Arg Arg Asn Gly His Arg Ile Leu Ala Val Val Arg Gly Ser Ala
          9300                9305              9310
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55

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Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro His Gly Pro
        9315                9320                9325
Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Ala
        9330                9335                9340
Pro Gly Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu
9345                9350                9355                9360
Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Glu
                9365                9370                9375
Lys Ser Ser Glu Gln Pro Leu Arg Leu Gly Ala Leu Lys Ser Asn Ile
            9380                9385                9390
Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val
        9395                9400                9405
Gln Ala Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu
    9410                9415                9420
Pro Ser Asp Gln Ile Asp Trp Ser Ala Gly Thr Val Glu Leu Leu Thr
9425                9430                9435                9440
Glu Ala Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala
                9445                9450                9455
Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu
            9460                9465                9470
Glu Glu Ala Pro Ala Val Glu Asp Ser Pro Ala Val Glu Pro Pro Ala
        9475                9480                9485
Gly Gly Gly Val Val Pro Trp Pro Val Ser Ala Lys Thr Pro Ala Ala
        9490                9495                9500
Leu Asp Ala Gln Ile Gly Gln Leu Ala Ala Tyr Ala Asp Gly Arg Thr
9505                9510                9515                9520
Asp Val Asp Pro Ala Val Ala Ala Arg Ala Leu Val Asp Ser Arg Thr
            9525                9530                9535
Ala Met Glu His Arg Ala Val Ala Val Gly Asp Ser Arg Glu Ala Leu
        9540                9545                9550
Arg Asp Ala Leu Arg Met Pro Glu Gly Leu Val Arg Gly Thr Ser Ser
        9555                9560                9565
Asp Val Gly Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp
    9570                9575                9580
Ala Gly Met Gly Ala Glu Leu Leu Asp Ser Ser Pro Glu Phe Ala Ala
9585                9590                9595                9600
Ser Met Ala Glu Cys Glu Thr Ala Leu Ser Arg Tyr Val Asp Trp Ser
            9605                9610                9615
Leu Glu Ala Val Val Arg Gln Glu Pro Gly Ala Pro Thr Leu Asp Arg
        9620                9625                9630
Val Asp Val Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala
    9635                9640                9645
Lys Val Trp Gln His His Gly Ile Thr Pro Gln Ala Val Val Gly His
    9650                9655                9660
Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu
9665                9670                9675                9680
Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala
            9685                9690                9695
His Leu Ala Gly Lys Gly Gly Met Ile Ser Leu Ala Leu Asp Glu Ala
        9700                9705                9710
Ala Val Leu Lys Arg Leu Ser Asp Phe Asp Gly Leu Ser Val Ala Ala
        9715                9720                9725
Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile
    9730                9735                9740
Glu Glu Leu Ala Arg Thr Cys Glu Ala Asp Gly Val Arg Ala Arg Ile
9745                9750                9755                9760
Ile Pro Val Asp Tyr Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu
            9765                9770                9775
Lys Glu Leu Ala Glu Val Leu Ala Gly Leu Ala Pro Gln Ala Pro His
        9780                9785                9790
Val Pro Phe Phe Ser Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val
    9795                9800                9805
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56

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Leu Asp Gly Thr Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe
    9810            9815              9820
Ala Pro Ala Val Glu Thr Leu Ala Val Asp Gly Phe Thr His Phe Ile
9825            9830              9835              9840
Glu Val Ser Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val
            9845              9850              9855
Thr Gly Leu Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu
            9860              9865              9870
Val Thr Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Ile Asp Trp
        9875              9880              9885
Ala Pro Ile Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr
    9890              9895              9900
Tyr Ala Phe Gln Thr Glu Arg Phe Trp Leu Gln Ser Ser Ala Pro Thr
9905            9910              9915              9920
Ser Ala Ala Asp Asp Trp Arg Tyr Arg Val Glu Trp Lys Pro Leu Thr
            9925              9930              9935
Ala Ser Gly Gln Ala Asp Leu Ser Gly Arg Trp Ile Val Ala Val Gly
        9940              9945              9950
Ser Glu Pro Glu Ala Glu Leu Leu Gly Ala Leu Lys Ala Ala Gly Ala
        9955              9960              9965
Glu Val Asp Val Leu Glu Ala Gly Ala Asp Asp Asp Arg Glu Ala Leu
    9970              9975              9980
Ala Ala Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly Phe Thr Gly Val
9985            9990              9995              10000
Val Ser Leu Leu Asp Asp Leu Val Pro Gln Val Ala Trp Val Gln Ala
            10005              10010              10015
Leu Gly Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser Val Thr Gln Gly
        10020              10025              10030
Ala Val Ser Val Gly Arg Leu Asp Thr Pro Ala Asp Pro Asp Arg Ala
        10035              10040              10045
Met Leu Trp Gly Leu Gly Arg Val Val Ala Leu Glu His Pro Glu Arg
    10050              10055              10060
Trp  Ala Gly Leu Val Asp Leu Pro Ala Gln Pro Asp Ala Ala Ala Leu
10065            10070              10075              10080
Ala His Leu Val Thr Ala Leu Ser Gly Ala Thr Gly Glu Asp Gln Ile
            10085              10090              10095
Ala Ile Arg Thr Thr Gly Leu His Ala Arg Arg Leu Ala Arg Ala Pro
        10100              10105              10110
Leu His Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro His Gly Thr Val
        10115              10120              10125
Leu Ile Thr Gly Gly Thr Gly Ala Leu Gly Ser His Ala Ala Arg Trp
    10130              10135              10140
Met  Ala His His Gly Ala Glu His Leu Leu Leu Val Ser Arg Ser Gly
10145              10150              10155              10160
Glu Gln Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr Ala Ser
            10165              10170              10175
Gly Ala Arg Val Thr Ile Ala Ala Cys Asp Val Ala Asp Pro His Ala
        10180              10185              10190
Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu Thr Ala
        10195              10200              10205
Val Val His Thr Ala Gly Ala Pro Gly Gly Asp Pro Leu Asp Val Thr
    10210              10215              10220
Gly  Pro Glu Asp Ile Ala Arg Ile Leu Gly Ala Lys Thr Ser Gly Ala
10225            10230              10235              10240
Glu Val Leu Asp Asp Leu Leu Arg Gly Thr Pro Leu Asp Ala Phe Val
            10245              10250              10255
Leu Tyr Ser Ser Asn Ala Gly Val Trp Gly Ser Gly Ser Gln Gly Val
            10260              10265              10270
Tyr Ala Ala Ala Asn Ala His Leu Asp Ala Leu Ala Ala Arg Arg Arg
        10275              10280              10285
Ala Arg Gly Glu Thr Ala Thr Ser Val Ala Trp Gly Leu Trp Ala Gly
    10290              10295              10300
```

57

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Asp  Gly Met Gly Arg Gly Ala Asp Asp Ala Tyr Trp Gln Arg Arg Gly
10305           10310           10315               10320
Ile Arg Pro Met Ser Pro Asp Arg Ala Leu Asp Glu Leu Ala Lys Ala
            10325           10330           10335
Leu Ser His Asp Glu Thr Phe Val Ala Val Ala Asp Val Asp Trp Glu
        10340           10345           10350
Arg Phe Ala Pro Ala Phe Thr Val Ser Arg Pro Ser Leu Leu Leu Asp
        10355           10360           10365
Gly Val Pro Glu Ala Arg Gln Ala Leu Ala Ala Pro Val Gly Ala Pro
    10370           10375           10380
Ala  Pro Gly Asp Ala Ala Val Ala Pro Thr Gly Gln Ser Ser Ala Leu
10385           10390           10395               10400
Ala Ala Ile Thr Ala Leu Pro Glu Pro Glu Arg Arg Pro Ala Leu Leu
            10405           10410           10415
Thr Leu Val Arg Thr His Ala Ala Ala Val Leu Gly His Ser Ser Pro
        10420           10425           10430
Asp Arg Val Ala Pro Gly Arg Ala Phe Thr Glu Leu Gly Phe Asp Ser
        10435           10440           10445
Leu Thr Ala Val Gln Leu Arg Asn Gln Leu Ser Thr Val Val Gly Asn
    10450           10455           10460
Arg  Leu Pro Ala Thr Thr Val Phe Asp His Pro Thr Pro Ala Ala Leu
10465           10470           10475               10480
Ala Ala His Leu His Glu Ala Tyr Leu Ala Pro Ala Glu Pro Ala Pro
            10485           10490           10495
Thr Asp Trp Glu Gly Arg Val Arg Arg Ala Leu Ala Glu Leu Pro Leu
        10500           10505           10510
Asp Arg Leu Arg Asp Ala Gly Val Leu Asp Thr Val Leu Arg Leu Thr
        10515           10520           10525
Gly Ile Glu Pro Glu Pro Gly Ser Gly Gly Ser Asp Gly Gly Ala Ala
    10530           10535           10540
Asp  Pro Gly Ala Glu Pro Glu Ala Ser Ile Asp Asp Leu Asp Ala Glu
10545           10550           10555               10560
Ala Leu Ile Arg Met Ala Leu Gly Pro Arg Asn Thr Met Thr Ser Ser
            10565           10570           10575
Asn Glu Gln Leu Val Asp Ala Leu Arg Ala Ser Leu Lys Glu Asn Glu
        10580           10585           10590
Glu Leu Arg Lys Glu Ser Arg Arg Arg Ala Asp Arg Arg Gln Glu Pro
        10595           10600           10605
Met Ala Ile Val Gly Met Ser Cys Arg Phe Ala Gly Gly Ile Arg Ser
    10610           10615           10620
Pro  Glu Asp Leu Trp Asp Ala Val Ala Ala Gly Lys Asp Leu Val Ser
10625           10630           10635               10640
Glu Val Pro Glu Glu Arg Gly Trp Asp Ile Asp Ser Leu Tyr Asp Pro
            10645           10650           10655
Val Pro Gly Arg Lys Gly Thr Thr Tyr Val Arg Asn Ala Ala Phe Leu
        10660           10665           10670
Asp Asp Ala Ala Gly Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg
        10675           10680           10685
Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Gln Leu Leu Glu Ala Ser
    10690           10695           10700
Trp  Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Ala Ser Val Arg Gly
10705           10710           10715               10720
Thr Asp Val Gly Val Tyr Val Gly Cys Gly Tyr Gln Asp Tyr Ala Pro
            10725           10730           10735
Asp Ile Arg Val Ala Pro Glu Gly Thr Gly Gly Tyr Val Val Thr Gly
        10740           10745           10750
Asn Ser Ser Ala Val Ala Ser Gly Arg Ile Ala Tyr Ser Leu Gly Leu
        10755           10760           10765
Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val
    10770           10775           10780
Ala  Leu His Leu Ala Leu Lys Gly Leu Arg Asn Gly Asp Cys Ser Thr
10785           10790           10795               10800
```

58

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Ala Leu Val Gly Gly Val Ala Val Leu Ala Thr Pro Gly Ala Phe Ile
            10805               10810               10815
Glu Phe Ser Ser Gln Gln Ala Met Ala Ala Asp Gly Arg Thr Lys Gly
            10820               10825               10830
Phe Ala Ser Ala Ala Asp Gly Leu Ala Trp Gly Glu Gly Val Ala Val
            10835               10840               10845
Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Lys Gly His Arg Val
         10850               10855               10860
Leu  Ala Val Val Arg Gly Ser Ala Ile Asn Gln Asp Gly Ala Ser Asn
10865               10870               10875               10880
Gly Leu Thr Ala Pro His Gly Pro Ser Gln Gln His Leu Ile Arg Gln
            10885               10890               10895
Ala Leu Ala Asp Ala Arg Leu Thr Ser Ser Asp Val Asp Val Val Glu
            10900               10905               10910
Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala
            10915               10920               10925
Leu Leu Ala Thr Tyr Gly Gln Gly Arg Ala Pro Gly Gln Pro Leu Arg
         10930               10935               10940
Leu  Gly Thr Leu Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ser Gly
10945               10950               10955               10960
Val Ala Gly Val Ile Lys Met Val Gln Ala Leu Arg His Gly Val Leu
            10965               10970               10975
Pro Lys Thr Leu His Val Asp Glu Pro Thr Asp Gln Val Asp Trp Ser
            10980               10985               10990
Ala Gly Ser Val Glu Leu Leu Thr Glu Ala Val Asp Trp Pro Glu Arg
            10995               11000               11005
Pro Gly Arg Leu Arg Arg Ala Gly Val Ser Ala Phe Gly Val Gly Gly
         11010               11015               11020
Thr  Asn Ala His Val Val Leu Glu Glu Ala Pro Ala Val Glu Glu Ser
11025               11030               11035               11040
Pro Ala Val Glu Pro Ala Gly Gly Gly Val Val Pro Trp Pro Val
            11045               11050               11055
Ser Ala Lys Thr Ser Ala Ala Leu Asp Ala Gln Ile Gly Gln Leu Ala
            11060               11065               11070
Ala Tyr Ala Glu Asp Arg Thr Asp Val Asp Pro Ala Val Ala Ala Arg
         11075               11080               11085
Ala Leu Val Asp Ser Arg Thr Ala Met Glu His Arg Ala Val Ala Val
         11090               11095               11100
Gly  Asp Ser Arg Glu Ala Leu Arg Asp Ala Leu Arg Met Pro Glu Gly
11105               11110               11115               11120
Leu Val Arg Gly Thr Val Thr Asp Pro Gly Arg Val Ala Phe Val Phe
            11125               11130               11135
Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp
            11140               11145               11150
Ser Ser Pro Glu Phe Ala Ala Ala Met Ala Glu Cys Glu Thr Ala Leu
         11155               11160               11165
Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro
         11170               11175               11180
Ser  Ala Pro Thr Leu Asp Arg Val Asp Val Val Gln Pro Val Thr Phe
11185               11190               11195               11200
Ala Val Met Val Ser Leu Ala Lys Val Trp Gln His His Gly Ile Thr
            11205               11210               11215
Pro Glu Ala Val Ile Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr
            11220               11225               11230
Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala Arg Val Val Thr Leu
         11235               11240               11245
Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Ile
         11250               11255               11260
Ser  Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg Ile Glu Asn Leu
11265               11270               11275               11280
His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val
            11285               11290               11295


                                59
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Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala
          11300              11305              11310
Asp Gly Ile Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser
          11315              11320              11325
Ala His Val Glu Thr Ile Glu Asn Glu Leu Ala Asp Val Leu Ala Gly
       11330              11335              11340
Leu  Ser Pro Gln Thr Pro Gln Val Pro Phe Phe Ser Thr Leu Glu Gly
11345              11350              11355              11360
Thr Trp Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr Trp Tyr Arg Asn
               11365              11370              11375
Leu Arg His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr
               11380              11385              11390
Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser Ala His Pro Val Leu
          11395              11400              11405
Thr Met Thr Leu Pro Asp Lys Val Thr Gly Leu Ala Thr Leu Arg Arg
       11410              11415              11420
Glu  Asp Gly Gly Gln His Arg Leu Thr Thr Ser Leu Ala Glu Ala Trp
11425              11430              11435              11440
Ala Asn Gly Leu Ala Leu Asp Trp Ala Ser Leu Leu Pro Ala Thr Gly
               11445              11450              11455
Ala Leu Ser Pro Ala Val Pro Asp Leu Pro Thr Tyr Ala Phe Gln His
          11460              11465              11470
Arg Ser Tyr Trp Ile Ser Pro Ala Gly Pro Gly Glu Ala Pro Ala His
          11475              11480              11485
Thr Ala Ser Gly Arg Glu Ala Val Ala Glu Thr Gly Leu Ala Trp Gly
       11490              11495              11500
Pro  Gly Ala Glu Asp Leu Asp Glu Glu Gly Arg Arg Ser Ala Val Leu
11505              11510              11515              11520
Ala Met Val Met Arg Gln Ala Ala Ser Val Leu Arg Cys Asp Ser Pro
               11525              11530              11535
Glu Glu Val Pro Val Asp Arg Pro Leu Arg Glu Ile Gly Phe Asp Ser
          11540              11545              11550
Leu Thr Ala Val Asp Phe Arg Asn Arg Val Asn Arg Leu Thr Gly Leu
          11555              11560              11565
Gln Leu Pro Pro Thr Val Val Phe Gln His Pro Thr Pro Val Ala Leu
       11570              11575              11580
Ala  Glu Arg Ile Ser Asp Glu Leu Ala Glu Arg Asn Trp Ala Val Ala
11585              11590              11595              11600
Glu Pro Ser Asp His Glu Gln Ala Glu Glu Glu Lys Ala Ala Ala Pro
               11605              11610              11615
Ala Gly Ala Arg Ser Gly Ala Asp Thr Gly Ala Gly Ala Gly Met Phe
          11620              11625              11630
Arg Ala Leu Phe Arg Gln Ala Val Glu Asp Asp Arg Tyr Gly Glu Phe
          11635              11640              11645
Leu Asp Val Leu Ala Glu Ala Ser Ala Phe Arg Pro Gln Phe Ala Ser
       11650              11655              11660
Pro  Glu Ala Cys Ser Glu Arg Leu Asp Pro Val Leu Leu Ala Gly Gly
11665              11670              11675              11680
Pro Thr Asp Arg Ala Glu Gly Arg Ala Val Leu Val Gly Cys Thr Gly
               11685              11690              11695
Thr Ala Ala Asn Gly Gly Pro His Glu Phe Leu Arg Leu Ser Thr Ser
          11700              11705              11710
Phe Gln Glu Glu Arg Asp Phe Leu Ala Val Pro Leu Pro Gly Tyr Gly
          11715              11720              11725
Thr Gly Thr Gly Thr Gly Thr Ala Leu Leu Pro Ala Asp Leu Asp Thr
       11730              11735              11740
Ala  Leu Asp Ala Gln Ala Arg Ala Ile Leu Arg Ala Ala Gly Asp Ala
11745              11750              11755              11760
Pro Val Val Leu Leu Gly His Ser Gly Gly Ala Leu Leu Ala His Glu
          11765              11770              11775
Leu Ala Phe Arg Leu Glu Arg Ala His Gly Ala Pro Pro Ala Gly Ile
          11780              11785              11790
```

60

Val Leu Val Asp Pro Tyr Pro Pro Gly His Gln Glu Pro Ile Glu Val
      11795   11800   11805
Trp Ser Arg Gln Leu Gly Glu Gly Leu Phe Ala Gly Glu Leu Glu Pro
    11810   11815   11820
Met Ser Asp Ala Arg Leu Leu Ala Met Gly Arg Tyr Ala Arg Phe Leu
11825   11830   11835   11840
Ala Gly Pro Arg Pro Gly Arg Ser Ser Ala Pro Val Leu Leu Val Arg
              11845   11850   11855
Ala Ser Glu Pro Leu Gly Asp Trp Gln Glu Glu Arg Gly Asp Trp Arg
              11860   11865   11870
Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val Pro Gly Asp His
         11875   11880   11885
Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala Glu Ala Val Leu
    11890   11895   11900
Ser Trp Leu Asp Ala Ile Glu Gly Ile Glu Gly Ala Gly Lys Met Thr
11905   11910   11915   11920
Asp Arg Pro Leu Asn Val Asp Ser Gly Leu Trp Ile Arg Arg Phe His
              11925   11930   11935
Pro Ala Pro Asn Ser Ala Val Arg Leu Val Cys Leu Pro His Ala Gly
         11940   11945   11950
Gly Ser Ala Ser Tyr Phe Phe Arg Phe Ser Glu Glu Leu His Pro Ser
         11955   11960   11965
Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg Gln Asp Arg Arg Ala
    11970   11975   11980
Glu Pro Cys Leu Glu Ser Val Glu Glu Leu Ala Glu His Val Val Ala
11985   11990   11995   12000
Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu Ala Phe Phe Gly His
              12005   12010   12015
Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala Arg Ile Leu Glu Gln
         12020   12025   12030
Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val Ser Gly Arg Arg Ala
         12035   12040   12045
Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln Leu Asp Asp Arg Ala
    12050   12055   12060
Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr Asp Glu Arg Phe Leu
12065   12070   12075   12080
Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro Ala Leu Arg Ser Asp
              12085   12090   12095
Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro Ser Ala Lys Leu Thr
         12100   12105   12110
Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp Pro Lys Ala Pro Leu
    12115   12120   12125
Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser Gly Pro Phe Cys Leu
    12130   12135   12140
Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp His Glu
12145   12150   12155   12160
Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly Ala Pro
              12165   12170   12175
Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu Ile Glu Gly Ala Ala
         12180   12185   12190
Lys Arg Trp Gln Asn Pro Arg
         12195

<210> 7
<211> 1248
<212> DNA
<213> Streptomyces venezuelae

<400> 7
gtgaaaagcg ccttatccga cctcgcattc ttcggcggcc ccgccgcttt cgaccagccg   60
ctcctcgtgg ggcggcccaa ccgcatcgac cgcgccaggc tgtacgagcg gctcgaccgg   120

61

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gccctcgaca gccagtggct gtccaacggc ggcccgctcg tccgcgagtt cgaggagcgc        180
gtcgccgggc tcgccggggt ccggcatgcc gtggccacct gcaacgccac ggccgggctc        240
cagctcctcg cgcacgccgc cggcctcacc ggcgaagtga tcatgccgtc gatgacgttc        300
gccgccaccc cgcacgcact gcgctggatc ggcctcaccc cggtcttcgc cgacatcgac        360
ccggacaccg gcaacctcga cccggaccag gtggccgccg cggtcacacc ccgcacctcg        420
gccgtcgtcg gcgtccacct ctggggccgc ccctgcgccg ccgaccagct gcggaaggtc        480
gccgacgagc acggcctgcg gctgtacttc gacgccgcgc acgccctcgg ctgcgcggtc        540
gacggccggc cgccggcag cctcggcgac gccgaggtct tcagcttcca cgccaccaag        600
gccgtcaacg ccttcgaggg cggcgccgtc gtcaccgacg acgccgacct cgccgcccgg        660
atccgcgccc tccacaactt cggcttcgac ctgcccggcg gcagccccgc cggcgggacc        720
aacgccaaga tgagcgaggc cgccgccgcc atgggcctca cctccctcga cgcgtttccc        780
gaggtcatcg accggaaccg cgcgaaccac gccgcctacc gcgagcacct cgcggacctc        840
cccggcgtcc tcgtcgccga ccacgaccgc cacggcctca caaccacca gtacgtgatc        900
gtcgagatcg acgaggccac caccggcatc caccgcgacc tcgtcatgga ggtcctgaag        960
gccgaaggcg tgcacacccg cgcctacttc tcgccgggct gccacgagct ggagccgtac       1020
cgcgggcagc cgcacgcccc gctgccgcac accgaacgcc tcgccgcgcg cgtgctgtcc       1080
ctgccgaccg gcaccgccat cggcgacgac gacatccgcc gggtcgccga cctgctgcgt       1140
ctctgcgcga cccgcggccg cgaactgacc gcgcgccacc gcgacacggc ccccgccccg       1200
ctcgcggccc cccagacatc cacgcccacg attggacgct cccgatga                     1248
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<210> 8
<211> 415
<212> PRT
<213> Streptomyces venezuelae

<400> 8
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Met Lys Ser Ala Leu Ser Asp Leu Ala Phe Phe Gly Gly Pro Ala Ala
 1               5                  10                  15
Phe Asp Gln Pro Leu Leu Val Gly Arg Pro Asn Arg Ile Asp Arg Ala
             20                  25                  30
Arg Leu Tyr Glu Arg Leu Asp Arg Ala Leu Asp Ser Gln Trp Leu Ser
         35                  40                  45
Asn Gly Gly Pro Leu Val Arg Glu Phe Glu Glu Arg Val Ala Gly Leu
     50                  55                  60
Ala Gly Val Arg His Ala Val Ala Thr Cys Asn Ala Thr Ala Gly Leu
 65                  70                  75                  80
Gln Leu Leu Ala His Ala Ala Gly Leu Thr Gly Glu Val Ile Met Pro
                 85                  90                  95
Ser Met Thr Phe Ala Ala Thr Pro His Ala Leu Arg Trp Ile Gly Leu
                100                 105                 110
Thr Pro Val Phe Ala Asp Ile Asp Pro Asp Thr Gly Asn Leu Asp Pro
             115                 120                 125
Asp Gln Val Ala Ala Ala Val Thr Pro Arg Thr Ser Ala Val Val Gly
     130                 135                 140
Val His Leu Trp Gly Arg Pro Cys Ala Ala Asp Gln Leu Arg Lys Val
145                 150                 155                 160
Ala Asp Glu His Gly Leu Arg Leu Tyr Phe Asp Ala Ala His Ala Leu
                165                 170                 175
Gly Cys Ala Val Asp Gly Arg Pro Ala Gly Ser Leu Gly Asp Ala Glu
             180                 185                 190
Val Phe Ser Phe His Ala Thr Lys Ala Val Asn Ala Phe Glu Gly Gly
         195                 200                 205
Ala Val Val Thr Asp Asp Ala Asp Leu Ala Ala Arg Ile Arg Ala Leu
     210                 215                 220
His Asn Phe Gly Phe Asp Leu Pro Gly Gly Ser Pro Ala Gly Gly Thr
225                 230                 235                 240
Asn Ala Lys Met Ser Glu Ala Ala Ala Ala Met Gly Leu Thr Ser Leu
                245                 250                 255
Asp Ala Phe Pro Glu Val Ile Asp Arg Asn Arg Arg Asn His Ala Ala
             260                 265                 270
Tyr Arg Glu His Leu Ala Asp Leu Pro Gly Val Leu Val Ala Asp His
         275                 280                 285
```

62

```
Asp Arg His Gly Leu Asn Asn His Gln Tyr Val Ile Val Glu Ile Asp
    290                 295                 300
Glu Ala Thr Thr Gly Ile His Arg Asp Leu Val Met Glu Val Leu Lys
305                 310                 315                 320
Ala Glu Gly Val His Thr Arg Ala Tyr Phe Ser Pro Gly Cys His Glu
                325                 330                 335
Leu Glu Pro Tyr Arg Gly Gln Pro His Ala Pro Leu Pro His Thr Glu
                340                 345                 350
Arg Leu Ala Ala Arg Val Leu Ser Leu Pro Thr Gly Thr Ala Ile Gly
                355                 360                 365
Asp Asp Asp Ile Arg Arg Val Ala Asp Leu Leu Arg Leu Cys Ala Thr
    370                 375                 380
Arg Gly Arg Glu Leu Thr Ala Arg His Arg Asp Thr Ala Pro Ala Pro
385                 390                 395                 400
Leu Ala Ala Pro Gln Thr Ser Thr Pro Thr Ile Gly Arg Ser Arg
                405                 410                 415

<210> 9
<211> 1458
<212> DNA
<213> Streptomyces venezuelae

<400> 9
atgaccgccc ccgccctttc cgccaccgcc ccggccgaac gctgcgcgca ccccggagcc      60
gatctggggg cggcggtcca cgccgtcggc cagaccctcg ccgccggcgg cctcgtgccg     120
cccgacgagg ccggaacgac cgccccgccac ctcgtccggc tcgccgtgcg ctacggcaac     180
agccccttca ccccgctgga ggaggcccgc cacgacctgg cgtcgaccg ggacgccttc     240
cggcgcctcc tcgccctgtt cgggcaggtc ccggagctcc gcaccgcggt cgagaccggc     300
cccgccgggg cgtactggaa gaacaccctg ctcccgctcg aacagcgcgg cgtcttcgac     360
gcggcgctcg ccaggaagcc cgtcttcccg tacagcgtcg gcctctaccc cggcccgacc     420
tgcatgttcc gctgccactt ctgcgtccgt gtgaccggcg cccgctacga cccgtccgcc     480
ctcgacgccg gcaacgccat gttccggtcg gtcatcgacg agatacccgc gggcaacccc     540
tcggcgatgt acttctccgg cggcctggag ccgctcacca ccccggcct cgggagcctg     600
gccgcgcacg ccaccgacca cggcctgcgg cccaccgtct acacgaactc cttcgcgctc     660
accgagcgca ccctggagcg ccagcccggc ctctgggggcc tgcacgccat ccgcacctcg     720
ctctacggcc tcaacgacga ggagtacgag cagaccaccg caagaaggc cgccttccgc     780
cgcgtccgcg agaacctgcg ccgcttccag cagctgcgcg ccgagcgcga gtcgccgatc     840
aacctcggct tcgcctacat cgtgctcccg ggccgtgcct cccgcctgct cgacctggtc     900
gacttcatcg ccgacctcaa cgacgccggg cagggcagga cgatcgactt cgtcaacatt     960
cgcgaggact acagcggccg tgacgacggc aagctgccgc aggaggagcg ggccgagctc    1020
caggaggccc tcaacgcctt cgaggagcgg gtccgcgagc gcacccccgg actccacatc    1080
gactacggct acgccctgaa cagcctgcgc accggggccg acgccgaact gctgcggatc    1140
aagcccgcca ccatgcggcc caccgcgcac ccgcaggtcg cggtgcaggt cgatctcctc    1200
ggcgacgtgt acctgtaccg cgaggccggc ttccccgacc tggacggcgc gacccgctac    1260
atcgcgggcc gcgtgacccc cgacacctcc ctcaccgagg tcgtcaggga cttcgtcgag    1320
cgcggcggcg aggtggcggc cgtcgacggc gacgagtact catggacgg cttcgatcag    1380
gtcgtcaccg cccgcctgaa ccagctggag cgcgacgccg cggacggctg ggaggaggcc    1440
cgcggcttcc tgcgctga                                                  1458

<210> 10
<211> 485
<212> PRT
<213> Streptomyces venezuelae

<400> 10
Met Thr Ala Pro Ala Leu Ser Ala Thr Ala Pro Ala Glu Arg Cys Ala
1                   5                   10                  15
His Pro Gly Ala Asp Leu Gly Ala Ala Val His Ala Val Gly Gln Thr
                20                  25                  30
Leu Ala Ala Gly Gly Leu Val Pro Pro Asp Glu Ala Gly Thr Thr Ala
        35                  40                  45
```

```
Arg His Leu Val Arg Leu Ala Val Arg Tyr Gly Asn Ser Pro Phe Thr
    50              55              60
Pro Leu Glu Glu Ala Arg His Asp Leu Gly Val Asp Arg Asp Ala Phe
65              70              75              80
Arg Arg Leu Leu Ala Leu Phe Gly Gln Val Pro Glu Leu Arg Thr Ala
            85              90              95
Val Glu Thr Gly Pro Ala Gly Ala Tyr Trp Lys Asn Thr Leu Leu Pro
        100             105             110
Leu Glu Gln Arg Gly Val Phe Asp Ala Ala Leu Ala Arg Lys Pro Val
        115             120             125
Phe Pro Tyr Ser Val Gly Leu Tyr Pro Gly Pro Thr Cys Met Phe Arg
    130             135             140
Cys His Phe Cys Val Arg Val Thr Gly Ala Arg Tyr Asp Pro Ser Ala
145             150             155             160
Leu Asp Ala Gly Asn Ala Met Phe Arg Ser Val Ile Asp Glu Ile Pro
            165             170             175
Ala Gly Asn Pro Ser Ala Met Tyr Phe Ser Gly Gly Leu Glu Pro Leu
            180             185             190
Thr Asn Pro Gly Leu Gly Ser Leu Ala Ala His Ala Thr Asp His Gly
    195             200             205
Leu Arg Pro Thr Val Tyr Thr Asn Ser Phe Ala Leu Thr Glu Arg Thr
    210             215             220
Leu Glu Arg Gln Pro Gly Leu Trp Gly Leu His Ala Ile Arg Thr Ser
225             230             235             240
Leu Tyr Gly Leu Asn Asp Glu Glu Tyr Glu Gln Thr Thr Gly Lys Lys
            245             250             255
Ala Ala Phe Arg Arg Val Arg Glu Asn Leu Arg Arg Phe Gln Gln Leu
            260             265             270
Arg Ala Glu Arg Glu Ser Pro Ile Asn Leu Gly Phe Ala Tyr Ile Val
    275             280             285
Leu Pro Gly Arg Ala Ser Arg Leu Leu Asp Leu Val Asp Phe Ile Ala
    290             295             300
Asp Leu Asn Asp Ala Gly Gln Gly Arg Thr Ile Asp Phe Val Asn Ile
305             310             315             320
Arg Glu Asp Tyr Ser Gly Arg Asp Asp Gly Lys Leu Pro Gln Glu Glu
            325             330             335
Arg Ala Glu Leu Gln Glu Ala Leu Asn Ala Phe Glu Glu Arg Val Arg
            340             345             350
Glu Arg Thr Pro Gly Leu His Ile Asp Tyr Gly Tyr Ala Leu Asn Ser
    355             360             365
Leu Arg Thr Gly Ala Asp Ala Glu Leu Leu Arg Ile Lys Pro Ala Thr
    370             375             380
Met Arg Pro Thr Ala His Pro Gln Val Ala Val Gln Val Asp Leu Leu
385             390             395             400
Gly Asp Val Tyr Leu Tyr Arg Glu Ala Gly Phe Pro Asp Leu Asp Gly
            405             410             415
Ala Thr Arg Tyr Ile Ala Gly Arg Val Thr Pro Asp Thr Ser Leu Thr
            420             425             430
Glu Val Val Arg Asp Phe Val Glu Arg Gly Gly Glu Val Ala Ala Val
        435             440             445
Asp Gly Asp Glu Tyr Phe Met Asp Gly Phe Asp Gln Val Val Thr Ala
    450             455             460
Arg Leu Asn Gln Leu Glu Arg Asp Ala Ala Asp Gly Trp Glu Glu Ala
465             470             475             480
Arg Gly Phe Leu Arg
            485

<210> 11
<211> 879
<212> DNA
<213> Streptomyces venezuelae
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64

<400> 11
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atgaagggaa tagtcctggc cggcgggagc ggaactcggc tgcatccggc gacctcggtc      60
atttcgaagc agattcttcc ggtctacaac aaaccgatga tctactatcc gctgtcggtt     120
ctcatgctcg gcggtattcg cgagattcaa atcatctcga ccccccagca catcgaactc     180
ttccagtcgc ttctcggaaa cggcaggcac ctgggaatag aactcgacta tgcggtccag     240
aaagagcccg caggaatcgc ggacgcactt ctcgtcggag ccgagcacat cggcgacgac     300
acctgcgccc tgatcctggg cgacaacatc ttccacgggc ccggcctcta cacgctcctg     360
cgggacagca tcgcgcgcct cgacggctgc gtgctcttcg gctacccggt caaggacccc     420
gagcggtacg gcgtcgccga ggtggacgcg acgggccggc tgaccgacct cgtcgagaag     480
cccgtcaagc cgcgctccaa cctcgccgtc accggcctct acctctacga caacgacgtc     540
gtcgacatcg ccaagaacat ccggcccctcg ccgcgcggcg agctggagat caccgacgtc     600
aaccgcgtct acctggagcg gggccgggcc gaactcgtca acctgggccg cggcttcgcc     660
tggctggaca ccggcaccca cgactcgctc ctgcgggccg cccagtacgt ccaggtcctg     720
gaggagcggc agggcgtctg gatcgcgggc cttgaggaga tcgccttccg catgggcttc     780
atcgacgccg aggcctgtca cggcctggga gaaggcctct cccgcaccga gtacggcagc     840
tatctgatgg agatcgccgg ccgcgaggga gccccgtga                           879
```

<210> 12
<211> 292
<212> PRT
<213> Streptomyces venezuelae

<400> 12
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Met Lys Gly Ile Val Leu Ala Gly Gly Ser Gly Thr Arg Leu His Pro
 1               5                  10                  15
Ala Thr Ser Val Ile Ser Lys Gln Ile Leu Pro Val Tyr Asn Lys Pro
                20                  25                  30
Met Ile Tyr Tyr Pro Leu Ser Val Leu Met Leu Gly Gly Ile Arg Glu
            35                  40                  45
Ile Gln Ile Ile Ser Thr Pro Gln His Ile Glu Leu Phe Gln Ser Leu
        50                  55                  60
Leu Gly Asn Gly Arg His Leu Gly Ile Glu Leu Asp Tyr Ala Val Gln
65                  70                  75                  80
Lys Glu Pro Ala Gly Ile Ala Asp Ala Leu Leu Val Gly Ala Glu His
                85                  90                  95
Ile Gly Asp Asp Thr Cys Ala Leu Ile Leu Gly Asp Asn Ile Phe His
            100                 105                 110
Gly Pro Gly Leu Tyr Thr Leu Leu Arg Asp Ser Ile Ala Arg Leu Asp
        115                 120                 125
Gly Cys Val Leu Phe Gly Tyr Pro Val Lys Asp Pro Glu Arg Tyr Gly
    130                 135                 140
Val Ala Glu Val Asp Ala Thr Gly Arg Leu Thr Asp Leu Val Glu Lys
145                 150                 155                 160
Pro Val Lys Pro Arg Ser Asn Leu Ala Val Thr Gly Leu Tyr Leu Tyr
                165                 170                 175
Asp Asn Asp Val Val Asp Ile Ala Lys Asn Ile Arg Pro Ser Pro Arg
            180                 185                 190
Gly Glu Leu Glu Ile Thr Asp Val Asn Arg Val Tyr Leu Glu Arg Gly
        195                 200                 205
Arg Ala Glu Leu Val Asn Leu Gly Arg Gly Phe Ala Trp Leu Asp Thr
    210                 215                 220
Gly Thr His Asp Ser Leu Leu Arg Ala Ala Gln Tyr Val Gln Val Leu
225                 230                 235                 240
Glu Glu Arg Gln Gly Val Trp Ile Ala Gly Leu Glu Glu Ile Ala Phe
                245                 250                 255
Arg Met Gly Phe Ile Asp Ala Glu Ala Cys His Gly Leu Gly Glu Gly
            260                 265                 270
Leu Ser Arg Thr Glu Tyr Gly Ser Tyr Leu Met Glu Ile Ala Gly Arg
        275                 280                 285
Glu Gly Ala Pro
    290
```

65

<210> 13
<211> 1014
<212> DNA
<213> Streptomyces venezuelae

<400> 13
gtgcggcttc tggtgaccgg aggtgcgggc ttcatcggct cgcacttcgt gcggcagctc   60
ctcgccgggg cgtaccccga cgtgcccgcc gatgaggtga tcgtcctgga cagcctcacc   120
tacgcgggca accgcgccaa cctcgccccg gtggacgcgg acccgcgact gcgcttcgtc   180
cacggcgaca tccgcgacgc cggcctcctc gcccgggaac tgcgcggcgt ggacgccatc   240
gtccacttcg cggccgagag ccacgtggac cgctccatcg cgggcgcgtc cgtgttcacc   300
gagaccaacg tgcagggcac gcagacgctg ctccagtgcg ccgtcgacgc cggcgtcggc   360
cgggtcgtgc acgtctccac cgacgaggtg tacgggtcga tcgactccgg ctcctggacc   420
gagagcagcc cgctggagcc caactcgccc tacgcggcgt ccaaggccgg ctccgacctc   480
gttgcccgcg cctaccaccg gacgtacggc ctcgacgtac ggatcacccg ctgctgcaac   540
aactacgggc cgtaccagca ccccgagaag ctcatccccc tcttcgtgac gaacctcctc   600
gacggcggga cgctcccgct gtacggcgac ggcgcgaacg tccgcgagtg ggtgcacacc   660
gacgaccact gccggggcat cgcgctcgtc ctcgcgggcg gccgggccgg cgagatctac   720
cacatcggcg gcggcctgga gctgaccaac cgcgaactca ccggcatcct cctggactcg   780
ctcggcgccg actggtcctc ggtccggaag gtcgccgacc gcaagggcca cgacctgcgc   840
tactccctcg acggcggcga gatcgagcgc gagctcggct accgcccgca ggtctccttc   900
gcggacggcc tcgcgcggac cgtccgctgg taccgggaga accgcggctg gtgggagccg   960
ctcaaggcga ccgccccgca gctgcccgcc accgccgtgg aggtgtccgc gtga   1014

<210> 14
<211> 337
<212> PRT
<213> Streptomyces venezuelae

<400> 14
Met Arg Leu Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Phe
  1   5   10   15
Val Arg Gln Leu Leu Ala Gly Ala Tyr Pro Asp Val Pro Ala Asp Glu
             20   25   30
Val Ile Val Leu Asp Ser Leu Thr Tyr Ala Gly Asn Arg Ala Asn Leu
         35   40   45
Ala Pro Val Asp Ala Asp Pro Arg Leu Arg Phe Val His Gly Asp Ile
     50   55   60
Arg Asp Ala Gly Leu Leu Ala Arg Glu Leu Arg Gly Val Asp Ala Ile
 65   70   75   80
Val His Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Ala Gly Ala
                 85   90   95
Ser Val Phe Thr Glu Thr Asn Val Gln Gly Thr Gln Thr Leu Leu Gln
                100   105   110
Cys Ala Val Asp Ala Gly Val Gly Arg Val Val His Val Ser Thr Asp
            115   120   125
Glu Val Tyr Gly Ser Ile Asp Ser Gly Ser Trp Thr Glu Ser Ser Pro
        130   135   140
Leu Glu Pro Asn Ser Pro Tyr Ala Ala Ser Lys Ala Gly Ser Asp Leu
145   150   155   160
Val Ala Arg Ala Tyr His Arg Thr Tyr Gly Leu Asp Val Arg Ile Thr
                165   170   175
Arg Cys Cys Asn Asn Tyr Gly Pro Tyr Gln His Pro Glu Lys Leu Ile
            180   185   190
Pro Leu Phe Val Thr Asn Leu Leu Asp Gly Gly Thr Leu Pro Leu Tyr
            195   200   205
Gly Asp Gly Ala Asn Val Arg Glu Trp Val His Thr Asp Asp His Cys
    210   215   220
Arg Gly Ile Ala Leu Val Leu Ala Gly Gly Arg Ala Gly Glu Ile Tyr
225   230   235   240
His Ile Gly Gly Gly Leu Glu Leu Thr Asn Arg Glu Leu Thr Gly Ile
                245   250   255

66

```
Leu Leu Asp Ser Leu Gly Ala Asp Trp Ser Ser Val Arg Lys Val Ala
            260                 265                 270
Asp Arg Lys Gly His Asp Leu Arg Tyr Ser Leu Asp Gly Gly Glu Ile
            275                 280                 285
Glu Arg Glu Leu Gly Tyr Arg Pro Gln Val Ser Phe Ala Asp Gly Leu
            290                 295                 300
Ala Arg Thr Val Arg Trp Tyr Arg Glu Asn Arg Gly Trp Trp Glu Pro
305                 310                 315                 320
Leu Lys Ala Thr Ala Pro Gln Leu Pro Ala Thr Ala Val Glu Val Ser
                325                 330                 335
Ala
```

<210> 15
<211> 1140
<212> DNA
<213> Streptomyces venezuelae

<400> 15
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gtgagcagcc gcgccgagac cccccgcgtc cccttcctcg acctcaaggc cgcctacgag    60
gagctccgcg cggagaccga cgccgcgatc gcccgcgtcc tcgactcggg cgctacctc   120
ctcggacccg aactcgaagg attcgaggcg gagttcgccg cgtactgcga cacggaccac   180
gccgtcggcg tgaacagcgg gatggacgcc ctccagctcg ccctccgcgg cctcggcatc   240
ggacccgggg acgaggtgat cgtcccctcg cacacgtaca tcgccagctg gctcgcggtg   300
tccgccaccg cgcgacccc cgtgcccgtc gagccgcacg aggaccaccc caccctggac   360
ccgctgctcg tcgagaaggc gatcacccc cgcacccggg cgctcctccc cgtccacctc   420
tacgggcacc ccgccgacat ggacgccctc cgcgagctcg cggaccggca cggcctgcac   480
atcgtcgagg acgccgcgca ggcccacggc gcccgctacc ggggccggcg gatcggcgcc   540
gggtcgtcgg tggccgcgtt cagcttctac ccgggcaaga acctcggctg cttcggcgac   600
ggcggcgccg tcgtcaccgg cgaccccgag ctcgccgaac ggctccggat gctccgcaac   660
tacggctcgc ggcagaagta cagccacgag acgaagggca ccaactcccg cctggacgag   720
atgcaggccg ccgtgctgcg gatccggctc gcccacctgg acagctggaa cggccgcagg   780
tcggcgctgg ccgcggagta cctctccggg ctcgccggac tgcccggcat cggcctgccg   840
gtgaccgcgc ccgacaccga cccggtctgg cacctcttca ccgtgcgcac cgagcgccgc   900
gacgagctgc gcagccacct cgacgcccgc ggcatcgaca ccctcacgca ctacccggta   960
cccgtgcacc tctcgcccgc ctacgcgggc gaggcaccgc cggaaggctc gctcccgcgg  1020
gccgagagct cgcgcggca ggtcctcagc ctgccgatcg gcccgcacct ggagcgcccg  1080
caggcgctgc gggtgatcga cgccgtgcgc gaatgggccg agcgggtcga ccaggcctag  1140
```

<210> 16
<211> 379
<212> PRT
<213> Streptomyces venezuelae

<400> 16
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Met Ser Ser Arg Ala Glu Thr Pro Arg Val Pro Phe Leu Asp Leu Lys
  1                 5                  10                  15
Ala Ala Tyr Glu Glu Leu Arg Ala Glu Thr Asp Ala Ala Ile Ala Arg
                20                  25                  30
Val Leu Asp Ser Gly Arg Tyr Leu Leu Gly Pro Glu Leu Glu Gly Phe
                35                  40                  45
Glu Ala Glu Phe Ala Ala Tyr Cys Glu Thr Asp His Ala Val Gly Val
            50                  55                  60
Asn Ser Gly Met Asp Ala Leu Gln Leu Ala Leu Arg Gly Leu Gly Ile
65                  70                  75                  80
Gly Pro Gly Asp Glu Val Ile Val Pro Ser His Thr Tyr Ile Ala Ser
                85                  90                  95
Trp Leu Ala Val Ser Ala Thr Gly Ala Thr Pro Val Pro Val Glu Pro
               100                 105                 110
His Glu Asp His Pro Thr Leu Asp Pro Leu Leu Val Glu Lys Ala Ile
           115                 120                 125
```

67

Thr Pro Arg Thr Arg Ala Leu Leu Pro Val His Leu Tyr Gly His Pro
    130   135   140
Ala Asp Met Asp Ala Leu Arg Glu Leu Ala Asp Arg His Gly Leu His
145   150   155   160
Ile Val Glu Asp Ala Ala Gln Ala His Gly Ala Arg Tyr Arg Gly Arg
                165   170   175
Arg Ile Gly Ala Gly Ser Ser Val Ala Ala Phe Ser Phe Tyr Pro Gly
                180   185   190
Lys Asn Leu Gly Cys Phe Gly Asp Gly Gly Ala Val Val Thr Gly Asp
            195   200   205
Pro Glu Leu Ala Glu Arg Leu Arg Met Leu Arg Asn Tyr Gly Ser Arg
        210   215   220
Gln Lys Tyr Ser His Glu Thr Lys Gly Thr Asn Ser Arg Leu Asp Glu
225   230   235   240
Met Gln Ala Ala Val Leu Arg Ile Arg Leu Ala His Leu Asp Ser Trp
                245   250   255
Asn Gly Arg Arg Ser Ala Leu Ala Ala Glu Tyr Leu Ser Gly Leu Ala
                260   265   270
Gly Leu Pro Gly Ile Gly Leu Pro Val Thr Ala Pro Asp Thr Asp Pro
            275   280   285
Val Trp His Leu Phe Thr Val Arg Thr Glu Arg Arg Asp Glu Leu Arg
        290   295   300
Ser His Leu Asp Ala Arg Gly Ile Asp Thr Leu Thr His Tyr Pro Val
305   310   315   320
Pro Val His Leu Ser Pro Ala Tyr Ala Gly Glu Ala Pro Pro Glu Gly
                325   330   335
Ser Leu Pro Arg Ala Glu Ser Phe Ala Arg Gln Val Leu Ser Leu Pro
                340   345   350
Ile Gly Pro His Leu Glu Arg Pro Gln Ala Leu Arg Val Ile Asp Ala
            355   360   365
Val Arg Glu Trp Ala Glu Arg Val Asp Gln Ala
    370   375

<210> 17
<211> 714
<212> DNA
<213> Streptomyces venezuelae

<400> 17
gtgtacgaag tcgaccacgc cgacgtctac gacctcttct acctgggtcg cggcaaggac   60
tacgccgccg aggcctccga catcgccgac ctggtgcgct cccgtacccc cgaggcctcc   120
tcgctcctgg acgtggcctg cggtacgggc acgcatctgg agcacttcac caaggagttc   180
ggcgacaccg ccggcctgga gctgtccgag gacatgctca cccacgcccg caagcggctg   240
cccgacgcca cgctccacca gggcgacatg cgggacttcc ggctcggccg gaagttctcc   300
gccgtggtca gcatgttcag ctccgtcggc tacctgaaga cgaccgagga actcggcgcg   360
gccgtcgcct cgttcgcgga gcacctggag cccggtggcg tcgtcgtcgt cgagccgtgg   420
tggttcccgg agaccttcgc cgacggctgg gtcagcgccg acgtcgtccg ccgtgacggg   480
cgcaccgtgg cccgtgtctc gcactcggtg cgggaggggg acgcgacgcg catggaggtc   540
cacttcaccg tggccgaccc gggcaagggc gtgcggcact tctccgacgt ccatctcatc   600
accctgttcc accaggccga gtacgaggcc gcgttcacgg ccgccgggct gcgcgtcgag   660
tacctggagg gcggcccgtc gggccgtggc ctcttcgtcg cgtccccgc ctga   714

<210> 18
<211> 237
<212> PRT
<213> Streptomyces venezuelae

<400> 18
Met Tyr Glu Val Asp His Ala Asp Val Tyr Asp Leu Phe Tyr Leu Gly
1   5   10   15
Arg Gly Lys Asp Tyr Ala Ala Glu Ala Ser Asp Ile Ala Asp Leu Val
                20   25   30

68

Arg Ser Arg Thr Pro Glu Ala Ser Ser Leu Leu Asp Val Ala Cys Gly
     35   40   45
Thr Gly Thr His Leu Glu His Phe Thr Lys Glu Phe Gly Asp Thr Ala
     50   55   60
Gly Leu Glu Leu Ser Glu Asp Met Leu Thr His Ala Arg Lys Arg Leu
65   70   75   80
Pro Asp Ala Thr Leu His Gln Gly Asp Met Arg Asp Phe Arg Leu Gly
              85   90   95
Arg Lys Phe Ser Ala Val Val Ser Met Phe Ser Ser Val Gly Tyr Leu
          100   105   110
Lys Thr Thr Glu Glu Leu Gly Ala Ala Val Ala Ser Phe Ala Glu His
          115   120   125
Leu Glu Pro Gly Gly Val Val Val Val Glu Pro Trp Trp Phe Pro Glu
          130   135   140
Thr Phe Ala Asp Gly Trp Val Ser Ala Asp Val Val Arg Arg Asp Gly
145   150   155   160
Arg Thr Val Ala Arg Val Ser His Ser Val Arg Glu Gly Asn Ala Thr
              165   170   175
Arg Met Glu Val His Phe Thr Val Ala Asp Pro Gly Lys Gly Val Arg
          180   185   190
His Phe Ser Asp Val His Leu Ile Thr Leu Phe His Gln Ala Glu Tyr
          195   200   205
Glu Ala Ala Phe Thr Ala Ala Gly Leu Arg Val Glu Tyr Leu Glu Gly
          210   215   220
Gly Pro Ser Gly Arg Gly Leu Phe Val Gly Val Pro Ala
225   230   235

<210> 19
<211> 1281
<212> DNA
<213> Streptomyces venezuelae

<400> 19
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atgcgcgtcc tgctgacctc gttcgcacat cacacgcact actacggcct ggtgcccctg        60
gcctggggcgc tgctcgccgc cgggcacgag gtgcgggtcg ccagccagcc cgcgctcacg       120
gacaccatca ccgggtccgg gctcgccgcg gtgccggtcg gcaccgacca cctcatccac       180
gagtaccggg tgcggatggc gggcgagccg cgcccgaacc atccggcgat cgccttcgac       240
gaggcccgtc ccgagccgct ggactgggac cacgccctcg gcatcgaggc gatcctcgcc       300
ccgtacttcc atctgctcgc caacaacgac tcgatggtcg acgacctcgt cgacttcgcc       360
cggtcctggc agccggacct ggtgctgtgg gagccgacga cctacgcggg cgccgtcgcc       420
gcccaggtca ccggtgccgc gcacgcccgg gtcctgtggg ggcccgacgt gatgggcagc       480
gcccgccgca agttcgtcgc gctgcgggac cggcagccgc ccgagcaccg cgaggacccc       540
accgcggagt ggctgacgtg gacgctcgac cggtacggcg cctccttcga agaggagctg       600
ctcaccggcc agttcacgat cgacccgacc ccgccgagcc tgcgcctcga cacgggcctg       660
ccgaccgtcg ggatgcgtta tgttccgtac aacggcacgt cggtcgtgcc ggactggctg       720
agtgagccgc ccgcgcggcc ccgggtctgc ctgaccctcg gcgtctccgc gcgtgaggtc       780
ctcggcggcg acggcgtctc gcagggcgac atcctggagg cgctcgccga cctcgacatc       840
gagctcgtcg ccacgctcga cgcgagtcag cgcgccgaga tccgcaacta cccgaagcac       900
acccggttca cggacttcgt gccgatgcac gcgctcctgc cgagctgctc ggcgatcatc       960
caccacggcg gggcgggcac ctacgcgacc gccgtgatca acgcggtgcc gcaggtcatg      1020
ctcgccgagc tgtgggacgc gccggtcaag gcgcgggccg tcgccgagca gggggcgggg      1080
ttcttcctgc cgccggccga gctcacgccg caggccgtgc gggacgccgt cgtccgcatc      1140
ctcgacgacc cctcggtcgc caccgccgcg caccggctgc gcgaggagac cttcggcgac      1200
cccacccccgg ccgggatcgt ccccgagctg gagcggctcg ccgcgcagca ccgccgcccg      1260
ccggccgacg cccggcactg a                                                1281
```

<210> 20
<211> 426
<212> PRT
<213> Streptomyces venezuelae

<400> 20
Met Arg Val Leu Leu Thr Ser Phe Ala His His Thr His Tyr Tyr Gly
 1   5   10   15
Leu Val Pro Leu Ala Trp Ala Leu Leu Ala Ala Gly His Glu Val Arg
            20   25   30
Val Ala Ser Gln Pro Ala Leu Thr Asp Thr Ile Thr Gly Ser Gly Leu
            35   40   45
Ala Ala Val Pro Val Gly Thr Asp His Leu Ile His Glu Tyr Arg Val
        50   55   60
Arg Met Ala Gly Glu Pro Arg Pro Asn His Pro Ala Ile Ala Phe Asp
65   70   75   80
Glu Ala Arg Pro Glu Pro Leu Asp Trp Asp His Ala Leu Gly Ile Glu
            85   90   95
Ala Ile Leu Ala Pro Tyr Phe His Leu Leu Ala Asn Asn Asp Ser Met
            100   105   110
Val Asp Asp Leu Val Asp Phe Ala Arg Ser Trp Gln Pro Asp Leu Val
            115   120   125
Leu Trp Glu Pro Thr Thr Tyr Ala Gly Ala Val Ala Ala Gln Val Thr
            130   135   140
Gly Ala Ala His Ala Arg Val Leu Trp Gly Pro Asp Val Met Gly Ser
145   150   155   160
Ala Arg Arg Lys Phe Val Ala Leu Arg Asp Arg Gln Pro Pro Glu His
            165   170   175
Arg Glu Asp Pro Thr Ala Glu Trp Leu Thr Trp Thr Leu Asp Arg Tyr
            180   185   190
Gly Ala Ser Phe Glu Glu Glu Leu Leu Thr Gly Gln Phe Thr Ile Asp
            195   200   205
Pro Thr Pro Pro Ser Leu Arg Leu Asp Thr Gly Leu Pro Thr Val Gly
            210   215   220
Met Arg Tyr Val Pro Tyr Asn Gly Thr Ser Val Val Pro Asp Trp Leu
225   230   235   240
Ser Glu Pro Pro Ala Arg Pro Arg Val Cys Leu Thr Leu Gly Val Ser
            245   250   255
Ala Arg Glu Val Leu Gly Gly Asp Gly Val Ser Gln Gly Asp Ile Leu
            260   265   270
Glu Ala Leu Ala Asp Leu Asp Ile Glu Leu Val Ala Thr Leu Asp Ala
            275   280   285
Ser Gln Arg Ala Glu Ile Arg Asn Tyr Pro Lys His Thr Arg Phe Thr
            290   295   300
Asp Phe Val Pro Met His Ala Leu Leu Pro Ser Cys Ser Ala Ile Ile
305   310   315   320
His His Gly Gly Ala Gly Thr Tyr Ala Thr Ala Val Ile Asn Ala Val
            325   330   335
Pro Gln Val Met Leu Ala Glu Leu Trp Asp Ala Pro Val Lys Ala Arg
            340   345   350
Ala Val Ala Glu Gln Gly Ala Gly Phe Phe Leu Pro Pro Ala Glu Leu
            355   360   365
Thr Pro Gln Ala Val Arg Asp Ala Val Val Arg Ile Leu Asp Asp Pro
            370   375   380
Ser Val Ala Thr Ala Ala His Arg Leu Arg Glu Glu Thr Phe Gly Asp
385   390   395   400
Pro Thr Pro Ala Gly Ile Val Pro Glu Leu Glu Arg Leu Ala Ala Gln
            405   410   415
His Arg Arg Pro Pro Ala Asp Ala Arg His
            420   425

<210> 21
<211> 1209
<212> DNA
<213> Streptomyces venezuelae

70

<400> 21
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gtgaccgacg acctgacggg ggccctcacg cagccccccgc tgggccgcac cgtccgcgcg    60
gtggccgacc gtgaactcgg cacccacctc ctggagaccc gcggcatcca ctggatccac   120
gccgcgaacg gcgacccgta cgccaccgtg ctgcgcggcc aggcggacga cccgtatccc   180
gcgtacgagc gggtgcgtgc ccgcggcgcg ctctccttca gcccgacggg cagctgggtc   240
accgccgatc acgccctggc ggcgagcatc ctctgctcga cggacttcgg ggtctccggc   300
gccgacggcg tcccggtgcc gcagcaggtc ctctcgtacg gggagggctg tccgctggag   360
cgcgagcagg tgctgccggc ggccggtgac gtgccggagg cgggcagcg tgccgtggtc   420
gaggggatcc accgggagac gctggaggt ctcgcgccgg acccgtcggc gtcgtacgcc   480
ttcgagctgc tgggcggttt cgtccgcccg gcggtgacgg ccgctgccgc cgccgtgctg   540
ggtgttcccg cggaccggcg cgcggacttc gcggatctgc tggagcggct ccggccgctg   600
tccgacagcc tgctggcccc gcagtccctg cggacggtac gggcggcgga cggcgcgctg   660
gccgagctca cggcgctgct cgccgattcg gacgactccc ccggggccct gctgtcggcg   720
ctcggggtca ccgcagccgt ccagctcacc gggaacgcgg tgctcgcgct cctcgcgcat   780
cccgagcagt ggcgggagct gtgcgaccgg cccgggctcg cggcggccgc ggtggaggag   840
accctccgct acgacccgcc ggtgcagctc gacgcccggg tggtccgcgg ggagacggag   900
ctggcgggcc ggcggctgcc ggccggggcg catgtcgtcg tcctgaccgc cgcgaccggc   960
cgggacccgg aggtcttcac ggacccggag cgcttcgacc tcgcgcgccc cgacgccgcc  1020
gcgcacctcg cgctgcaccc cgccggtccg tacggcccgg tggcgtccct ggtccggctt  1080
caggcggagg tcgcgctgcg gaccctggcc gggcgtttcc ccgggctgcg gcaggcgggg  1140
gacgtgctcc gcccccgccg cgcgcctgtc ggccgcgggc cgctgagcgt cccggtcagc  1200
agctcctga                                                          1209
```

<210> 22
<211> 402
<212> PRT
<213> Streptomyces venezuelae

<400> 22
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Met Thr Asp Asp Leu Thr Gly Ala Leu Thr Gln Pro Pro Leu Gly Arg
 1               5                  10                  15
Thr Val Arg Ala Val Ala Asp Arg Glu Leu Gly Thr His Leu Leu Glu
            20                  25                  30
Thr Arg Gly Ile His Trp Ile His Ala Ala Asn Gly Asp Pro Tyr Ala
        35                  40                  45
Thr Val Leu Arg Gly Gln Ala Asp Asp Pro Tyr Pro Ala Tyr Glu Arg
    50                  55                  60
Val Arg Ala Arg Gly Ala Leu Ser Phe Ser Pro Thr Gly Ser Trp Val
65                  70                  75                  80
Thr Ala Asp His Ala Leu Ala Ala Ser Ile Leu Cys Ser Thr Asp Phe
                85                  90                  95
Gly Val Ser Gly Ala Asp Gly Val Pro Val Pro Gln Gln Val Leu Ser
            100                 105                 110
Tyr Gly Glu Gly Cys Pro Leu Glu Arg Glu Gln Val Leu Pro Ala Ala
        115                 120                 125
Gly Asp Val Pro Glu Gly Gly Gln Arg Ala Val Val Glu Gly Ile His
        130                 135                 140
Arg Glu Thr Leu Glu Gly Leu Ala Pro Asp Pro Ser Ala Ser Tyr Ala
145                 150                 155                 160
Phe Glu Leu Leu Gly Gly Phe Val Arg Pro Ala Val Thr Ala Ala Ala
                165                 170                 175
Ala Ala Val Leu Gly Val Pro Ala Asp Arg Arg Ala Asp Phe Ala Asp
                180                 185                 190
Leu Leu Glu Arg Leu Arg Pro Leu Ser Asp Ser Leu Leu Ala Pro Gln
            195                 200                 205
Ser Leu Arg Thr Val Arg Ala Ala Asp Gly Ala Leu Ala Glu Leu Thr
    210                 215                 220
Ala Leu Leu Ala Asp Ser Asp Asp Ser Pro Gly Ala Leu Leu Ser Ala
225                 230                 235                 240
Leu Gly Val Thr Ala Ala Val Gln Leu Thr Gly Asn Ala Val Leu Ala
                245                 250                 255
```

71

```
Leu Leu Ala His Pro Glu Gln Trp Arg Glu Leu Cys Asp Arg Pro Gly
        260                 265                 270
Leu Ala Ala Ala Ala Val Glu Glu Thr Leu Arg Tyr Asp Pro Pro Val
        275                 280                 285
Gln Leu Asp Ala Arg Val Val Arg Gly Glu Thr Glu Leu Ala Gly Arg
        290                 295                 300
Arg Leu Pro Ala Gly Ala His Val Val Val Leu Thr Ala Ala Thr Gly
305                 310                 315                 320
Arg Asp Pro Glu Val Phe Thr Asp Pro Glu Arg Phe Asp Leu Ala Arg
                325                 330                 335
Pro Asp Ala Ala Ala His Leu Ala Leu His Pro Ala Gly Pro Tyr Gly
                340                 345                 350
Pro Val Ala Ser Leu Val Arg Leu Gln Ala Glu Val Ala Leu Arg Thr
                355                 360                 365
Leu Ala Gly Arg Phe Pro Gly Leu Arg Gln Ala Gly Asp Val Leu Arg
        370                 375                 380
Pro Arg Arg Ala Pro Val Gly Arg Gly Pro Leu Ser Val Pro Val Ser
385                 390                 395                 400
Ser Ser


<210> 23
<211> 2430
<212> DNA
<213> Streptomyces venezuelae

<400> 23
gtgacaggta agacccgaat accgcgtgtc cgccgcggcc gcaccacgcc cagggccttc    60
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gccgccgaca cggccaatgt tcagtacacg agccgggcgg cggagctcgt cgcccagatg   180
acgctcgacg agaaagatcag cttcgtccac tgggcgctgg accccgaccg gcagaacgtc   240
ggctaccttc ccggcgtgcc gcgtctgggc atcccggagc tgcgtgccgc cgacggcccg   300
aacggcatcc gcctggtggg gcagaccgcc accgcgctgc ccgcgccggt cgccctggcc   360
agcaccttcg acgacaccat ggccgacagc tacggcaagg tcatgggccg cgacggtcgc   420
gcgctcaacc aggacatggt cctgggcccg atgatgaaca acatccgggt gccgcacggc   480
ggccggaact acgagacctt cagcgaggac cccctggtct cctcgcgcac cgcggtcgcc   540
cagatcaagg gcatccaggg tgcgggtctg atgaccacgg ccaagcactt cgcggccaac   600
aaccaggaga caaaccgctt ctccgtgaac gccaatgtcg acgagcagac gctccgcgag   660
atcgagttcc cggcgttcga ggcgtcctcc aaggccggcg cggcctcctt catgtgtgcc   720
tacaacggcc tcaacgggaa gccgtcctgc ggcaacgacg agctcctcaa caacgtgctg   780
cgcacgcagt ggggcttcca gggctgggtg atgtccgact ggctcgccac cccgggcacc   840
gacgccatca ccaagggcct cgaccaggag atgggcgtcg agctccccgg cgacgtcccg   900
aagggcgagc cctcgccgcc ggccaagttc ttcggcgagg cgctgaagac ggccgtcctg   960
aacggcacgg tccccgaggc ggccgtgacg cggtcggcgg agcggatcgt cggccagatg  1020
gagaagttcg tctgctcct cgccactccg gcgccgcggc ccgagcgcga caaggcgggt  1080
gcccaggcgg tgtcccgcaa ggtcgccgag aacggcgcgg tgctcctgcg caacgagggc  1140
caggccctgc cgctcgccgg tgacgccggc aagagcatcg cggtcatcgg cccgacggcc  1200
gtcgacccca aggtcaccgg cctgggcagc gcccacgtcg tcccggactc ggcggcggcg  1260
ccactcgaca ccatcaaggc ccgcgcgggt gcgggtgcga cggtgacgta cgagacgggt  1320
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gacggcgagt accgcatcgc ggtccgtgcc accggtggtt acgccacggt gcagctcggc  1500
agccacacca tcgaggccgg tcaggtctac ggcaaggtga gcagcccgct cctcaagctg  1560
accaagggca cgcacaagct cacgatctcg ggcttcgcga tgagtgccac cccgctctcc  1620
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tcggcgcgga aggcccgtac ggcggtcgtc ttcgcctacg acgacggcac cgagggcgtc  1740
gaccgtccga acctgtcgct gccgggtacg caggacaagc tgatctcggc tgtcgcggac  1800
gccaacccga acacgatcgt ggtcctcaac accggttcgt cggtgctgat gccgtggctg  1860
tccaagaccc gcgcggtcct ggacatgtgg tacccgggcc aggcgggcgc cgaggccacc  1920
gccgcgctgc tctacggtga cgtcaacccg agcggcaagc tcacgcagag cttcccggcc  1980
gccgagaacc agcacgcggt cgccggcgac ccgacaagct acccgggcgt cgacaaccag  2040
cagacgtacc gcgagggcat ccacgtcggg taccgctggt cgacaaggga gaacgtcaag  2100
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72

```
ccgctgttcc cgttcgggca cggcctgtcg tacacctcgt tcacgcagag cgccccgacc    2160
gtcgtgcgta cgtccacggg tggtctgaag gtcacggtca cggtccgcaa cagcgggaag    2220
cgcgccggcc aggaggtcgt ccaggcgtac ctcggtgcca gcccgaacgt gacggctccg    2280
caggcgaaga agaagctcgt gggctacacg aaggtctcgc tcgccgcggg cgaggcgaag    2340
acggtgacgg tgaacgtcga ccgccgtcag ctgcagaccg gttcgtcctc cgccgacctg    2400
cggggcagcg ccacggtcaa cgtctggtga                                     2430
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<210> 24
<211> 809
<212> PRT
<213> Streptomyces venezuelae

<400> 24

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Met Thr Gly Lys Thr Arg Ile Pro Arg Val Arg Arg Gly Arg Thr Thr
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Pro Arg Ala Phe Thr Leu Ala Val Val Gly Thr Leu Leu Ala Gly Thr
            20                  25                  30
Thr Val Ala Ala Ala Ala Pro Gly Ala Ala Asp Thr Ala Asn Val Gln
        35                  40                  45
Tyr Thr Ser Arg Ala Ala Glu Leu Val Ala Gln Met Thr Leu Asp Glu
    50                  55                  60
Lys Ile Ser Phe Val His Trp Ala Leu Asp Pro Asp Arg Gln Asn Val
65                  70                  75                  80
Gly Tyr Leu Pro Gly Val Pro Arg Leu Gly Ile Pro Glu Leu Arg Ala
                85                  90                  95
Ala Asp Gly Pro Asn Gly Ile Arg Leu Val Gly Gln Thr Ala Thr Ala
            100                 105                 110
Leu Pro Ala Pro Val Ala Leu Ala Ser Thr Phe Asp Asp Thr Met Ala
        115                 120                 125
Asp Ser Tyr Gly Lys Val Met Gly Arg Asp Gly Arg Ala Leu Asn Gln
    130                 135                 140
Asp Met Val Leu Gly Pro Met Met Asn Asn Ile Arg Val Pro His Gly
145                 150                 155                 160
Gly Arg Asn Tyr Glu Thr Phe Ser Glu Asp Pro Leu Val Ser Ser Arg
                165                 170                 175
Thr Ala Val Ala Gln Ile Lys Gly Ile Gln Gly Ala Gly Leu Met Thr
            180                 185                 190
Thr Ala Lys His Phe Ala Ala Asn Asn Gln Glu Asn Asn Arg Phe Ser
        195                 200                 205
Val Asn Ala Asn Val Asp Glu Gln Thr Leu Arg Glu Ile Glu Phe Pro
    210                 215                 220
Ala Phe Glu Ala Ser Ser Lys Ala Gly Ala Ala Ser Phe Met Cys Ala
225                 230                 235                 240
Tyr Asn Gly Leu Asn Gly Lys Pro Ser Cys Gly Asn Asp Glu Leu Leu
                245                 250                 255
Asn Asn Val Leu Arg Thr Gln Trp Gly Phe Gln Gly Trp Val Met Ser
            260                 265                 270
Asp Trp Leu Ala Thr Pro Gly Thr Asp Ala Ile Thr Lys Gly Leu Asp
        275                 280                 285
Gln Glu Met Gly Val Glu Leu Pro Gly Asp Val Pro Lys Gly Glu Pro
    290                 295                 300
Ser Pro Pro Ala Lys Phe Phe Gly Glu Ala Leu Lys Thr Ala Val Leu
305                 310                 315                 320
Asn Gly Thr Val Pro Glu Ala Ala Val Thr Arg Ser Ala Glu Arg Ile
                325                 330                 335
Val Gly Gln Met Glu Lys Phe Gly Leu Leu Leu Ala Thr Pro Ala Pro
            340                 345                 350
Arg Pro Glu Arg Asp Lys Ala Gly Ala Gln Ala Val Ser Arg Lys Val
        355                 360                 365
Ala Glu Asn Gly Ala Val Leu Leu Arg Asn Glu Gly Gln Ala Leu Pro
    370                 375                 380
```

73

```
Leu Ala Gly Asp Ala Gly Lys Ser Ile Ala Val Ile Gly Pro Thr Ala
385             390             395                 400
Val Asp Pro Lys Val Thr Gly Leu Gly Ser Ala His Val Val Pro Asp
            405             410                 415
Ser Ala Ala Ala Pro Leu Asp Thr Ile Lys Ala Arg Ala Gly Ala Gly
            420             425             430
Ala Thr Val Thr Tyr Glu Thr Gly Glu Glu Thr Phe Gly Thr Gln Ile
            435             440             445
Pro Ala Gly Asn Leu Ser Pro Ala Phe Asn Gln Gly His Gln Leu Glu
            450             455             460
Pro Gly Lys Ala Gly Ala Leu Tyr Asp Gly Thr Leu Thr Val Pro Ala
465             470             475                 480
Asp Gly Glu Tyr Arg Ile Ala Val Arg Ala Thr Gly Gly Tyr Ala Thr
                485             490                 495
Val Gln Leu Gly Ser His Thr Ile Glu Ala Gly Gln Val Tyr Gly Lys
            500             505             510
Val Ser Ser Pro Leu Leu Lys Leu Thr Lys Gly Thr His Lys Leu Thr
            515             520             525
Ile Ser Gly Phe Ala Met Ser Ala Thr Pro Leu Ser Leu Glu Leu Gly
            530             535             540
Trp Val Thr Pro Ala Ala Ala Asp Ala Thr Ile Ala Lys Ala Val Glu
545             550             555                 560
Ser Ala Arg Lys Ala Arg Thr Ala Val Val Phe Ala Tyr Asp Asp Gly
                565             570                 575
Thr Glu Gly Val Asp Arg Pro Asn Leu Ser Leu Pro Gly Thr Gln Asp
            580             585             590
Lys Leu Ile Ser Ala Val Ala Asp Ala Asn Pro Asn Thr Ile Val Val
            595             600             605
Leu Asn Thr Gly Ser Ser Val Leu Met Pro Trp Leu Ser Lys Thr Arg
            610             615             620
Ala Val Leu Asp Met Trp Tyr Pro Gly Gln Ala Gly Ala Glu Ala Thr
625             630             635                 640
Ala Ala Leu Leu Tyr Gly Asp Val Asn Pro Ser Gly Lys Leu Thr Gln
            645             650             655
Ser Phe Pro Ala Ala Glu Asn Gln His Ala Val Ala Gly Asp Pro Thr
            660             665             670
Ser Tyr Pro Gly Val Asp Asn Gln Gln Thr Tyr Arg Glu Gly Ile His
            675             680             685
Val Gly Tyr Arg Trp Phe Asp Lys Glu Asn Val Lys Pro Leu Phe Pro
690             695             700
Phe Gly His Gly Leu Ser Tyr Thr Ser Phe Thr Gln Ser Ala Pro Thr
705             710             715                 720
Val Val Arg Thr Ser Thr Gly Gly Leu Lys Val Thr Val Thr Val Arg
            725             730             735
Asn Ser Gly Lys Arg Ala Gly Gln Glu Val Val Gln Ala Tyr Leu Gly
            740             745             750
Ala Ser Pro Asn Val Thr Ala Pro Gln Ala Lys Lys Lys Leu Val Gly
            755             760             765
Tyr Thr Lys Val Ser Leu Ala Ala Gly Glu Ala Lys Thr Val Thr Val
770             775             780
Asn Val Asp Arg Arg Gln Leu Gln Thr Gly Ser Ser Ser Ala Asp Leu
785             790             795                 800
Arg Gly Ser Ala Thr Val Asn Val Trp
                805
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<210> 25
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> A synthetic consensus sequence.

74

<220>
<221> VARIANT
<222> (4)...(4)
<223> Residue 4 is either V or I.

<400> 25
Leu Leu Asp Val Ala Cys Gly Thr Gly
 1   5

<210> 26
<211> 1011
<212> DNA
<213> Streptomyces venezuelae

<400> 26
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ggccagaact tccttcagga cgacagagcc gtgcgcaatc tcgtcacgca tgtcgagggg     120
gacggtagga acgttctcga aatcggcccc ggaaagggcg cgataaccga ggagttggtg     180
cgctccttcg acaccgtgac ggtcgtggag atggacccgc actgggccgc gcatgtgcgg     240
cggaaattcg aaggggagag ggtcaccgta ttccagggtg atttcctcga cttccgcatt     300
ccgcgcgata tcgacaccgt cgtcggaaac gttcccttcg gcatcacgac ccagattctc     360
cggagtctcc tggaatcgac gaactggcag tcggcggccc tgatagtgca gtgggaggtc     420
gcccgcaaac gcgccggtcg cagcggcgga tcgctcctca cgacctcctg gcccccctgg     480
tacgagttcg cggtccacga ccgcgtccgc gcctcgtcgt tccgtccgat gccccgcgtc     540
gacggcggcg tcctgacgat caggcgacgc ccccagcccc tgctgcccga gagcgcgagc     600
cgcgccttcc agaacttcgc cgaagccgtc ttcaccggcc ccggacgggg cctcgcggag     660
atcctccggc gccacatccc caagcggacc taccgttccc tcgccgaccg ccacggaatt     720
ccggacggcg gactgccgaa ggacctcacg ctcacccaat ggatcgccct tttccaggcc     780
tcccagccga gttacgcgcc ggggggcgccc ggcacgcgca tgccggggcca gggcggtggc     840
gccggcggca gggactatga ctcggagacg agcagggccg ccgtgcccgg gagccgcaga     900
tacggcccca cgcgcggcgg cgaaccctgc gcaccccgcg cacaggtccg gcagaccaag     960
ggccgccagg gcgcgcgagg ctcgtcgtac ggacgccgca cgggccgtta g            1011
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<210> 27
<211> 336
<212> PRT
<213> Streptomyces venezuelae

<400> 27
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Met Ala Met Arg Asp Ser Ile Pro Arg Arg Ala Asp Arg Asp Thr Leu
 1               5                  10                  15
Arg Arg Glu Leu Gly Gln Asn Phe Leu Gln Asp Asp Arg Ala Val Arg
                20                  25                  30
Asn Leu Val Thr His Val Glu Gly Asp Gly Arg Asn Val Leu Glu Ile
                35                  40                  45
Gly Pro Gly Lys Gly Ala Ile Thr Glu Glu Leu Val Arg Ser Phe Asp
        50                  55                  60
Thr Val Thr Val Val Glu Met Asp Pro His Trp Ala Ala His Val Arg
65                  70                  75                  80
Arg Lys Phe Glu Gly Glu Arg Val Thr Val Phe Gln Gly Asp Phe Leu
                85                  90                  95
Asp Phe Arg Ile Pro Arg Asp Ile Asp Thr Val Val Gly Asn Val Pro
                100                 105                 110
Phe Gly Ile Thr Thr Gln Ile Leu Arg Ser Leu Leu Glu Ser Thr Asn
                115                 120                 125
Trp Gln Ser Ala Ala Leu Ile Val Gln Trp Glu Val Ala Arg Lys Arg
        130                 135                 140
Ala Gly Arg Ser Gly Gly Ser Leu Leu Thr Thr Ser Trp Ala Pro Trp
145                 150                 155                 160
Tyr Glu Phe Ala Val His Asp Arg Val Arg Ala Ser Ser Phe Arg Pro
                165                 170                 175
```

75

```
Met Pro Arg Val Asp Gly Gly Val Leu Thr Ile Arg Arg Arg Pro Gln
        180                 185                 190
Pro Leu Leu Pro Glu Ser Ala Ser Arg Ala Phe Gln Asn Phe Ala Glu
        195                 200                 205
Ala Val Phe Thr Gly Pro Gly Arg Gly Leu Ala Glu Ile Leu Arg Arg
        210                 215                 220
His Ile Pro Lys Arg Thr Tyr Arg Ser Leu Ala Asp Arg His Gly Ile
225                 230                 235                 240
Pro Asp Gly Gly Leu Pro Lys Asp Leu Thr Leu Thr Gln Trp Ile Ala
                245                 250                 255
Leu Phe Gln Ala Ser Gln Pro Ser Tyr Ala Pro Gly Ala Pro Gly Thr
        260                 265                 270
Arg Met Pro Gly Gln Gly Gly Gly Ala Gly Gly Arg Asp Tyr Asp Ser
        275                 280                 285
Glu Thr Ser Arg Ala Ala Val Pro Gly Ser Arg Arg Tyr Gly Pro Thr
        290                 295                 300
Arg Gly Gly Glu Pro Cys Ala Pro Arg Ala Gln Val Arg Gln Thr Lys
305                 310                 315                 320
Gly Arg Gln Gly Ala Arg Gly Ser Ser Tyr Gly Arg Arg Thr Gly Arg
                325                 330                 335


<210> 28
<211> 969
<212> DNA
<213> Streptomyces venezuelae

<400> 28
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tcagtgatcg acgagatcga cggcctggtg gccaggacca agggtccgat actggagatc       120
ggtccgggtg acggcgccct gaccctgccg ctgagcaggc acggcaggcc gatcaccgcc       180
gtcgagctcg acggccggcg cgcgcagcgc ctcggtgccc gcaccccgg tcatgtgacc        240
gtggtgcacc acgacttcct gcagtacccg ctgccgcgca cccgcatgt ggtcgtcggc        300
aacgtcccct tccatctgac gacggcgatc atgcggcggc tgctcgacgc cagcactgg        360
cacaccgccg tcctcctcgt ccagtgggag gtcgcccggc gccgggccgg cgtcggcggg       420
tcgacgctgc tgacggccgg ctgggcgccc tggtacgagt tcgacctgca ctcccgggtc       480
cccgcgcggg ccttccgtcc gatgccgggc gtggacggag gagtactggc catccggcgg       540
cggtccgcgc cgctcgtggg ccaggtgaag acgtaccagg acttcgtacg ccaggtgttc       600
accggcaagg ggaacgggct gaaggagatc ctgcggcgga ccgggcggat ctcgcagcgg       660
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aagcccgggc agtgggcgtc gctgtgggag ctgaccggcg gcacggccga cggatccttc       780
gacggtacgg cgggcggtgg cgcggccgga tcgcacgggg cggctcgggt cggggccggt       840
cacccgggcg gccgggtgtc cgcgagccgg cggggcgtgc cgcaggcgcg cgcggccgg        900
gggcatgcgg tacggagctc cacggggacc gagccgaggt ggggcagggg cggggcggag       960
agcgcgtga                                                               969


<210> 29
<211> 322
<212> PRT
<213> Streptomyces venezuelae

<400> 29
Met Ala Phe Ser Pro Gln Gly Gly Arg His Glu Leu Gly Gln Asn Phe
1                 5                   10                  15
Leu Val Asp Arg Ser Val Ile Asp Glu Ile Asp Gly Leu Val Ala Arg
        20                  25                  30
Thr Lys Gly Pro Ile Leu Glu Ile Gly Pro Gly Asp Gly Ala Leu Thr
        35                  40                  45
Leu Pro Leu Ser Arg His Gly Arg Pro Ile Thr Ala Val Glu Leu Asp
        50                  55                  60
Gly Arg Arg Ala Gln Arg Leu Gly Ala Arg Thr Pro Gly His Val Thr
65                  70                  75                  80
```

```
Val Val His His Asp Phe Leu Gln Tyr Pro Leu Pro Arg Asn Pro His
            85                  90                  95
Val Val Val Gly Asn Val Pro Phe His Leu Thr Thr Ala Ile Met Arg
            100                 105                 110
Arg Leu Leu Asp Ala Gln His Trp His Thr Ala Val Leu Leu Val Gln
            115                 120                 125
Trp Glu Val Ala Arg Arg Arg Ala Gly Val Gly Gly Ser Thr Leu Leu
    130                 135                 140
Thr Ala Gly Trp Ala Pro Trp Tyr Glu Phe Asp Leu His Ser Arg Val
145                 150                 155                 160
Pro Ala Arg Ala Phe Arg Pro Met Pro Gly Val Asp Gly Gly Val Leu
            165                 170                 175
Ala Ile Arg Arg Arg Ser Ala Pro Leu Val Gly Gln Val Lys Thr Tyr
            180                 185                 190
Gln Asp Phe Val Arg Gln Val Phe Thr Gly Lys Gly Asn Gly Leu Lys
            195                 200                 205
Glu Ile Leu Arg Arg Thr Gly Arg Ile Ser Gln Arg Asp Leu Ala Thr
    210                 215                 220
Trp Leu Arg Arg Asn Glu Ile Ser Pro His Ala Leu Pro Lys Asp Leu
225                 230                 235                 240
Lys Pro Gly Gln Trp Ala Ser Leu Trp Glu Leu Thr Gly Gly Thr Ala
            245                 250                 255
Asp Gly Ser Phe Asp Gly Thr Ala Gly Gly Gly Ala Ala Gly Ser His
            260                 265                 270
Gly Ala Ala Arg Val Gly Ala Gly His Pro Gly Gly Arg Val Ser Ala
    275                 280                 285
Ser Arg Arg Gly Val Pro Gln Ala Arg Arg Gly Arg Gly His Ala Val
    290                 295                 300
Arg Ser Ser Thr Gly Thr Glu Pro Arg Trp Gly Arg Gly Arg Ala Glu
305                 310                 315                 320
Ser Ala


<210> 30
<211> 13842
<212> DNA
<213> Streptomyces venezuelae

<400> 30
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gcagcgtggg acacggggga agtgcgggtc cgacgggggt tgccccctgc cggccccgat   120
catgcggagc actccttctc tcgtgctcct accggtgatg tgcgcgccga attgattcgt   180
ggagagatgt cgacagtgtc caagagtgag tccgaggaat tcgtgtccgt gtcgaacgac   240
gccggttccg cgcacggcac agcggaaccc gtcgccgtcg tcggcatctc ctgccgggtg   300
cccggcgccc gggacccgag agagttctgg gaactcctgg cggcaggcgg ccaggccgtc   360
accgacgtcc ccgcggaccg ctggaacgcc ggcgacttct acgacccgga ccgctccgcc   420
cccggccgct cgaacagccg gtggggcggg ttcatcgagg acgtcgaccg gttcgacgcc   480
gccttcttcg gcatctcgcc ccgcgaggcc gcggagatgg acccgcagca gcggctcgcc   540
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acccgcaccg gcgtcttcgc cggcgccatc tgggacgact acgccaccct gaagcaccgc   660
cagggcggcg ccgcgatcac cccgcacacc gtcaccggcc tccaccgcgg catcatcgcg   720
aaccgactct cgtacacgct cgggctccgc ggccccagca tggtcgtcga ctccggccag   780
tcctcgtcgc tcgtcgccgt ccacctcgcg tgcgagagcc tgcggcgcgg cgagtccgag   840
ctcgccctcg ccggcggcgt ctcgctcaac ctggtgccgg acagcatcat cggggcgagc   900
aagttcggcg gcctctcccc cgacggccgc gcctacacct cgacgcgcg cgccaacggc    960
tacgtacgcg gcgagggcgg cggtttcgtc gtcctgaagc gcctctcccg ggccgtcgcc   1020
gacggcgacc cggtgctcgc cgtgatccgg ggcagcgccg tcaacaacgg cggcgccgcc   1080
cagggcatga cgaccccga cgcgcaggcg caggaggccg tgctccgcga ggcccacgag   1140
cgggccggga ccgcgccggc cgacgtgcgg tacgtcgagc tgcacggcac cggcaccccc   1200
gtgggcgacc cgatcgaggc cgctgcgctc ggcgccgccc tcggcaccgg ccgcccggcc   1260
ggacagccgc tcctggtcgg ctcggtcaag acgaacatcg ccacctgga gggcgcggcc    1320
ggcatcgccg cctcatcaa ggccgtcctg gcggtccgcg tcgcgcgct gcccgccagc    1380
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                                    77

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ctgaactacg agaccccgaa cccggcgatc ccgttcgagg aactgaacct ccgggtgaac    1440
acggagtacc tgccgtggga gccggagcac gacgggcagc ggatggtcgt cggcgtgtcc    1500
tcgttcggca tgggcggcac gaacgcgcat gtcgtgctcg aagaggcccc cgggggttgt    1560
cgaggtgctt cggtcgtgga gtcgacggtc ggcgggtcgg cggtcggcgg cggtgtggtg    1620
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gcgttcgcct cgcgggatcg tacggatggt gtcgacgcgg gcgctgtcga tgcgggtgct    1740
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gccgtcgtcg tcggcagcgg gccggacgat ctggcggcag cgctggccgc gcctgagggt    1860
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atggccgaat gcgaggccgc actctccccg tacgtcgact ggtcgctgga ggccgtcgta    2040
cggcaggccc ccggtgcgcc cacgctggag cgggtcgatg tcgtgcagcc tgtgacgttc    2100
gccgtcatgg tctcgctggc tcgcgtgtgg cagcaccacg gggtgacgcc ccaggcggtc    2160
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gacctcccca cctacgcgtt ccagaccgag cgccactggc tgggcgagat cgaggcgctc    2940
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gcggagctcg accgggacga gcagctgcgc gtgatcctgg acaaggtccg ggcgcagacg    3060
gcccaggtgc tggggtacgc gacaggcggg cagatcgagg tcgaccggac cttccgtgag    3120
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79

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<400> 31

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            35                  40                  45
Ala Pro Thr Gly Asp Val Arg Ala Glu Leu Ile Arg Gly Glu Met Ser
        50                  55                  60
Thr Val Ser Lys Ser Glu Ser Glu Glu Phe Val Ser Val Ser Asn Asp
65                  70                  75                  80
Ala Gly Ser Ala His Gly Thr Ala Glu Pro Val Ala Val Val Gly Ile
                85                  90                  95
Ser Cys Arg Val Pro Gly Ala Arg Asp Pro Arg Glu Phe Trp Glu Leu
               100                 105                 110
Leu Ala Ala Gly Gly Gln Ala Val Thr Asp Val Pro Ala Asp Arg Trp
           115                 120                 125
Asn Ala Gly Asp Phe Tyr Asp Pro Asp Arg Ser Ala Pro Gly Arg Ser
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Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Ala Glu Met Asp Pro Gln
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Gln Arg Leu Ala Leu Glu Leu Gly Trp Glu Ala Leu Glu Arg Ala Gly
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Ile Asp Pro Ser Ser Leu Thr Gly Thr Arg Thr Gly Val Phe Ala Gly
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Ala Ile Trp Asp Asp Tyr Ala Thr Leu Lys His Arg Gln Gly Gly Ala
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81

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Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro Gly Ala Pro Thr
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Leu Glu Arg Val Asp Val Val Gln Pro Val Thr Phe Ala Val Met Val
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Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala
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Val Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro
785                 790                 795                 800
Val Gln Ile Glu Glu Leu Ala Arg Ala Cys Glu Ala Asp Gly Val Arg
            805                 810                 815
Ala Arg Val Ile Pro Val Asp Tyr Ala Ser His Ser Arg Gln Val Glu
            820                 825                 830
Ile Ile Glu Ser Glu Leu Ala Glu Val Leu Ala Gly Leu Ser Pro Gln
            835                 840                 845
Ala Pro Arg Val Pro Phe Phe Ser Thr Leu Glu Gly Ala Trp Ile Thr
    850                 855                 860
Glu Pro Val Leu Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg His Arg
865                 870                 875                 880
Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu Gly Phe
            885                 890                 895
Thr His Phe Val Glu Val Ser Ala His Pro Val Leu Thr Met Ala Leu
            900                 905                 910
Pro Gly Thr Val Thr Gly Leu Ala Thr Leu Arg Arg Asp Asn Gly Gly
            915                 920                 925
Gln Asp Arg Leu Val Ala Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu
    930                 935                 940
Ala Val Asp Trp Ser Pro Leu Leu Pro Ser Ala Thr Gly His His Ser
945                 950                 955                 960
Asp Leu Pro Thr Tyr Ala Phe Gln Thr Glu Arg His Trp Leu Gly Glu
            965                 970                 975
Ile Glu Ala Leu Ala Pro Ala Gly Glu Pro Ala Val Gln Pro Ala Val
            980                 985                 990
Leu Arg Thr Glu Ala Ala Glu Pro Ala Glu Leu Asp Arg Asp Glu Gln
    995                 1000                1005
Leu Arg Val Ile Leu Asp Lys Val Arg Ala Gln Thr Ala Gln Val Leu
    1010                1015                1020
Gly Tyr Ala Thr Gly Gly Gln Ile Glu Val Asp Arg Thr Phe Arg Glu
1025                1030                1035                1040
Ala Gly Cys Thr Ser Leu Thr Gly Val Asp Leu Arg Asn Arg Ile Asn
            1045                1050                1055
Ala Ala Phe Gly Val Arg Met Ala Pro Ser Met Ile Phe Asp Phe Pro
            1060                1065                1070
Thr Pro Glu Ala Leu Ala Glu Gln Leu Leu Leu Val Val His Gly Glu
            1075                1080                1085
Ala Ala Ala Asn Pro Ala Gly Ala Glu Pro Ala Pro Val Ala Ala Ala
    1090                1095                1100
Gly Ala Val Asp Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu
1105                1110                1115                1120
Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Gly
            1125                1130                1135
Gly Gly Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val
            1140                1145                1150
Glu Gly Leu Tyr His Pro Asp Pro Glu His Pro Gly Thr Ser Tyr Val
            1155                1160                1165
Arg Gln Gly Gly Phe Ile Glu Asn Val Ala Gly Phe Asp Ala Ala Phe
    1170                1175                1180
Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg
1185                1190                1195                1200
Leu Leu Leu Glu Thr Ser Trp Glu Ala Val Glu Asp Ala Gly Ile Asp
            1205                1210                1215
Pro Thr Ser Leu Arg Gly Arg Gln Val Gly Val Phe Thr Gly Ala Met
            1220                1225                1230
```

Thr His Glu Tyr Gly Pro Ser Leu Arg Asp Gly Gly Glu Gly Leu Asp
       1235   1240   1245

Gly Tyr Leu Leu Thr Gly Asn Thr Ala Ser Val Met Ser Gly Arg Val
       1250   1255   1260

Ser Tyr Thr Leu Gly Leu Glu Gly Pro Ala Leu Thr Val Asp Thr Ala
1265   1270   1275   1280

Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala Leu Arg
              1285   1290   1295

Lys Gly Glu Val Asp Met Ala Leu Ala Gly Gly Val Ala Val Met Pro
       1300   1305   1310

Thr Pro Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Gly
       1315   1320   1325

Asp Gly Arg Ser Lys Ala Phe Ala Ala Ser Ala Asp Gly Thr Ser Trp
       1330   1335   1340

Ser Glu Gly Val Gly Val Leu Leu Val Glu Arg Leu Ser Asp Ala Arg
1345   1350   1355   1360

Arg Asn Gly His Gln Val Leu Ala Val Val Arg Gly Ser Ala Leu Asn
              1365   1370   1375

Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln
       1380   1385   1390

Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Thr Thr Ser
       1395   1400   1405

Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp
       1410   1415   1420

Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Gly Arg Asp
1425   1430   1435   1440

Asp Glu Gln Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Ile Gly His
              1445   1450   1455

Thr Gln Ala Ala Ala Gly Val Ser Gly Val Ile Lys Met Val Gln Ala
              1460   1465   1470

Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu Pro Ser
       1475   1480   1485

Asp Gln Ile Asp Trp Ser Ala Gly Ala Val Glu Leu Leu Thr Glu Ala
       1490   1495   1500

Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala Ala Val
1505   1510   1515   1520

Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu Glu Glu
              1525   1530   1535

Ala Pro Val Val Val Glu Gly Ala Ser Val Val Glu Pro Ser Val Gly
       1540   1545   1550

Gly Ser Ala Val Gly Gly Gly Val Thr Pro Trp Val Val Ser Ala Lys
       1555   1560   1565

Ser Ala Ala Ala Leu Asp Ala Gln Ile Glu Arg Leu Ala Ala Phe Ala
       1570   1575   1580

Ser Arg Asp Arg Thr Asp Asp Ala Asp Ala Gly Ala Val Asp Ala Gly
1585   1590   1595   1600

Ala Val Ala His Val Leu Ala Asp Gly Arg Ala Gln Phe Glu His Arg
              1605   1610   1615

Ala Val Ala Leu Gly Ala Gly Ala Asp Asp Leu Val Gln Ala Leu Ala
       1620   1625   1630

Asp Pro Asp Gly Leu Ile Arg Gly Thr Ala Ser Gly Val Gly Arg Val
       1635   1640   1645

Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly Ala
       1650   1655   1660

Glu Leu Leu Asp Ser Ser Ala Val Phe Ala Ala Ala Met Ala Glu Cys
1665   1670   1675   1680

Glu Ala Ala Leu Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala Val Val
              1685   1690   1695

Arg Gln Ala Pro Gly Ala Pro Thr Leu Glu Arg Val Asp Val Val Gln
       1700   1705   1710

Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Arg Val Trp Gln His
       1715   1720   1725

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His Gly Val Thr Pro Gln Ala Val Val Gly His Ser Gln Gly Glu Ile
    1730                1735                1740
Ala Ala Ala Tyr Val Ala Gly Ala Leu Pro Leu Asp Asp Ala Ala Arg
1745                1750                1755                1760
Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly Lys
                1765                1770                1775
Gly Gly Met Leu Ser Leu Ala Leu Asn Glu Asp Ala Val Leu Glu Arg
                1780                1785                1790
Leu Ser Asp Phe Asp Gly Leu Ser Val Ala Ala Val Asn Gly Pro Thr
        1795                1800                1805
Ala Thr Val Val Ser Gly Asp Pro Val Gln Ile Glu Glu Leu Ala Gln
    1810                1815                1820
Ala Cys Lys Ala Asp Gly Phe Arg Ala Arg Ile Ile Pro Val Asp Tyr
1825                1830                1835                1840
Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu Ser Glu Leu Ala Gln
                1845                1850                1855
Val Leu Ala Gly Leu Ser Pro Gln Ala Pro Arg Val Pro Phe Phe Ser
            1860                1865                1870
Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val Leu Asp Gly Thr Tyr
        1875                1880                1885
Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala Ile Glu
    1890                1895                1900
Thr Leu Ala Val Asp Glu Gly Phe Thr His Phe Val Glu Val Ser Ala
1905                1910                1915                1920
His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly Leu Gly
                1925                1930                1935
Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu Val Thr Ser Leu
            1940                1945                1950
Ala Glu Ala Trp Val Asn Gly Leu Pro Val Ala Trp Thr Ser Leu Leu
    1955                1960                1965
Pro Ala Thr Ala Ser Arg Pro Gly Leu Pro Thr Tyr Ala Phe Gln Ala
    1970                1975                1980
Glu Arg Tyr Trp Leu Glu Asn Thr Pro Ala Ala Leu Ala Thr Gly Asp
1985                1990                1995                2000
Asp Trp Arg Tyr Arg Ile Asp Trp Lys Arg Leu Pro Ala Ala Glu Gly
                2005                2010                2015
Ser Glu Arg Thr Gly Leu Ser Gly Arg Trp Leu Ala Val Thr Pro Glu
            2020                2025                2030
Asp His Ser Ala Gln Ala Ala Ala Val Leu Thr Ala Leu Val Asp Ala
        2035                2040                2045
Gly Ala Lys Val Glu Val Leu Thr Ala Gly Ala Asp Asp Asp Arg Glu
    2050                2055                2060
Ala Leu Ala Ala Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly Phe Thr
2065                2070                2075                2080
Gly Val Val Ser Leu Leu Asp Gly Leu Val Pro Gln Val Ala Trp Val
            2085                2090                2095
Gln Ala Leu Gly Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser Val Thr
            2100                2105                2110
Gln Gly Ala Val Ser Val Gly Arg Leu Asp Thr Pro Ala Asp Pro Asp
        2115                2120                2125
Arg Ala Met Leu Trp Gly Leu Gly Arg Val Val Ala Leu Glu His Pro
    2130                2135                2140
Glu Arg Trp Ala Gly Leu Val Asp Leu Pro Ala Gln Pro Asp Ala Ala
2145                2150                2155                2160
Ala Leu Ala His Leu Val Thr Ala Leu Ser Gly Ala Thr Gly Glu Asp
            2165                2170                2175
Gln Ile Ala Ile Arg Thr Thr Gly Leu His Ala Arg Arg Leu Ala Arg
        2180                2185                2190
Ala Pro Leu His Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro His Gly
        2195                2200                2205
Thr Val Leu Ile Thr Gly Gly Thr Gly Ala Leu Gly Ser His Ala Ala
    2210                2215                2220
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85

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Arg Trp Met Ala His His Gly Ala Glu His Leu Leu Leu Val Ser Arg
2225                2230                2235                2240
Ser Gly Glu Gln Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr
                2245                2250                2255
Ala Ser Gly Ala Arg Val Thr Ile Ala Ala Cys Asp Val Ala Asp Pro
            2260                2265                2270
His Ala Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu
            2275                2280                2285
Thr Ala Val Val His Thr Ala Gly Ala Leu Asp Asp Gly Ile Val Asp
        2290                2295                2300
Thr Leu Thr Ala Glu Gln Val Arg Arg Ala His Arg Ala Lys Ala Val
2305                2310                2315                2320
Gly Ala Ser Val Leu Asp Glu Leu Thr Arg Asp Leu Asp Leu Asp Ala
                2325                2330                2335
Phe Val Leu Phe Ser Ser Val Ser Ser Thr Leu Gly Ile Pro Gly Gln
            2340                2345                2350
Gly Asn Tyr Ala Pro His Asn Ala Tyr Leu Asp Ala Leu Ala Ala Arg
            2355                2360                2365
Arg Arg Ala Thr Gly Arg Ser Ala Val Ser Val Ala Trp Gly Pro Trp
        2370                2375                2380
Asp Gly Gly Gly Met Ala Ala Gly Asp Gly Val Ala Glu Arg Leu Arg
2385                2390                2395                2400
Asn His Gly Val Pro Gly Met Asp Pro Glu Leu Ala Leu Ala Ala Leu
                2405                2410                2415
Glu Ser Ala Leu Gly Arg Asp Glu Thr Ala Ile Thr Val Ala Asp Ile
            2420                2425                2430
Asp Trp Asp Arg Phe Tyr Leu Ala Tyr Ser Ser Gly Arg Pro Gln Pro
            2435                2440                2445
Leu Val Glu Glu Leu Pro Glu Val Arg Arg Ile Ile Asp Ala Arg Asp
        2450                2455                2460
Ser Ala Thr Ser Gly Gln Gly Gly Ser Ser Ala Gln Gly Ala Asn Pro
2465                2470                2475                2480
Leu Ala Glu Arg Leu Ala Ala Ala Ala Pro Gly Glu Arg Thr Glu Ile
            2485                2490                2495
Leu Leu Gly Leu Val Arg Ala Gln Ala Ala Ala Val Leu Arg Met Arg
            2500                2505                2510
Ser Pro Glu Asp Val Ala Ala Asp Arg Ala Phe Lys Asp Ile Gly Phe
        2515                2520                2525
Asp Ser Leu Ala Gly Val Glu Leu Arg Asn Arg Leu Thr Arg Ala Thr
        2530                2535                2540
Gly Leu Gln Leu Pro Ala Thr Leu Val Phe Asp His Pro Thr Pro Leu
2545                2550                2555                2560
Ala Leu Val Ser Leu Leu Arg Ser Glu Phe Leu Gly Asp Glu Glu Thr
            2565                2570                ·2575
Ala Asp Ala Arg Arg Ser Ala Ala Leu Pro Ala Thr Val Gly Ala Gly
            2580                2585                2590
Ala Gly Ala Gly Ala Gly Thr Asp Ala Asp Asp Pro Ile Ala Ile
            2595                2600                2605
Val Ala Met Ser Cys Arg Tyr Pro Gly Asp Ile Arg Ser Pro Glu Asp
        2610                2615                2620
Leu Trp Arg Met Leu Ser Glu Gly Gly Glu Gly Ile Thr Pro Phe Pro
2625                2630                2635                2640
Thr Asp Arg Gly Trp Asp Leu Asp Gly Leu Tyr Asp Ala Asp Pro Asp
            2645                2650                2655
Ala Leu Gly Arg Ala Tyr Val Arg Glu Gly Gly Phe Leu His Asp Ala
            2660                2665                2670
Ala Glu Phe Asp Ala Glu Phe Phe Gly Val Ser Pro Arg Glu Ala Leu
            2675                2680                2685
Ala Met Asp Pro Gln Gln Arg Met Leu Leu Thr Thr Ser Trp Glu Ala
        2690                2695                2700
Phe Glu Arg Ala Gly Ile Glu Pro Ala Ser Leu Arg Gly Ser Ser Thr
2705                2710                2715                2720
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86

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Gly Val Phe Ile Gly Leu Ser Tyr Gln Asp Tyr Ala Ala Arg Val Pro
              2725                2730                2735
Asn Ala Pro Arg Gly Val Glu Gly Tyr Leu Leu Thr Gly Ser Thr Pro
              2740                2745                2750
Ser Val Ala Ser Gly Arg Ile Ala Tyr Thr Phe Gly Leu Glu Gly Pro
              2755                2760                2765
Ala Thr Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Thr Ala Leu His
    2770                2775                2780
Leu Ala Val Arg Ala Leu Arg Ser Gly Glu Cys Thr Met Ala Leu Ala
2785                2790                2795                2800
Gly Gly Val Ala Met Met Ala Thr Pro His Met Phe Val Glu Phe Ser
              2805                2810                2815
Arg Gln Arg Ala Leu Ala Pro Asp Gly Arg Ser Lys Ala Phe Ser Ala
              2820                2825                2830
Asp Ala Asp Gly Phe Gly Ala Ala Glu Gly Val Gly Leu Leu Leu Val
              2835                2840                2845
Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His Pro Val Leu Ala Val
              2850                2855                2860
Val Arg Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr
2865                2870                2875                2880
Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala
              2885                2890                2895
Asp Ala Arg Leu Ala Pro Gly Asp Ile Asp Ala Val Glu Thr His Gly
              2900                2905                2910
Thr Gly Thr Ser Leu Gly Asp Pro Ile Glu Ala Gln Gly Leu Gln Ala
              2915                2920                2925
Thr Tyr Gly Lys Glu Arg Pro Ala Glu Arg Pro Leu Ala Ile Gly Ser
              2930                2935                2940
Val Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Ala Ala Gly
2945                2950                2955                2960
Ile Ile Lys Met Val Leu Ala Met Arg His Gly Thr Leu Pro Lys Thr
              2965                2970                2975
Leu His Ala Asp Glu Pro Ser Pro His Val Asp Trp Ala Asn Ser Gly
              2980                2985                2990
Leu Ala Leu Val Thr Glu Pro Ile Asp Trp Pro Ala Gly Thr Gly Pro
              2995                3000                3005
Arg Arg Ala Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His
    3010                3015                3020
Val Val Leu Glu Gln Ala Pro Asp Ala Ala Gly Glu Val Leu Gly Ala
3025                3030                3035                3040
Asp Glu Val Pro Glu Val Ser Glu Thr Val Ala Met Ala Gly Thr Ala
              3045                3050                3055
Gly Thr Ser Glu Val Ala Glu Gly Ser Glu Ala Ser Glu Ala Pro Ala
              3060                3065                3070
Ala Pro Gly Ser Arg Glu Ala Ser Leu Pro Gly His Leu Pro Trp Val
              3075                3080                3085
Leu Ser Ala Lys Asp Glu Gln Ser Leu Arg Gly Gln Ala Ala Ala Leu
    3090                3095                3100
His Ala Trp Leu Ser Glu Pro Ala Ala Asp Leu Ser Asp Ala Asp Gly
3105                3110                3115                3120
Pro Ala Arg Leu Arg Asp Val Gly Tyr Thr Leu Ala Thr Ser Arg Thr
              3125                3130                3135
Ala Phe Ala His Arg Ala Ala Val Thr Ala Ala Asp Arg Asp Gly Phe
              3140                3145                3150
Leu Asp Gly Leu Ala Thr Leu Ala Gln Gly Gly Thr Ser Ala His Val
    3155                3160                3165
His Leu Asp Thr Ala Arg Asp Gly Thr Thr Ala Phe Leu Phe Thr Gly
3170                3175                3180
Gln Gly Ser Gln Arg Pro Gly Ala Gly Arg Glu Leu Tyr Asp Arg His
3185                3190                3195                3200
Pro Val Phe Ala Arg Ala Leu Asp Glu Ile Cys Ala His Leu Asp Gly
              3205                3210                3215
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87

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His Leu Glu Leu Pro Leu Leu Asp Val Met Phe Ala Ala Glu Gly Ser
          3220                    3225              3230
Ala Glu Ala Ala Leu Leu Asp Glu Thr Arg Tyr Thr Gln Cys Ala Leu
          3235                    3240              3245
Phe Ala Leu Glu Val Ala Leu Phe Arg Leu Val Glu Ser Trp Gly Met
     3250                    3255              3260
Arg Pro Ala Ala Leu Leu Gly His Ser Val Gly Glu Ile Ala Ala Ala
3265                    3270              3275                3280
His Val Ala Gly Val Phe Ser Leu Ala Asp Ala Ala Arg Leu Val Ala
                    3285              3290              3295
Ala Arg Gly Arg Leu Met Gln Glu Leu Pro Ala Gly Gly Ala Met Leu
          3300                    3305              3310
Ala Val Gln Ala Ala Glu Asp Glu Ile Arg Val Trp Leu Glu Thr Glu
          3315                    3320              3325
Glu Arg Tyr Ala Gly Arg Leu Asp Val Ala Ala Val Asn Gly Pro Glu
          3330                    3335              3340
Ala Ala Val Leu Ser Gly Asp Ala Asp Ala Ala Arg Glu Ala Glu Ala
3345                    3350              3355                3360
Tyr Trp Ser Gly Leu Gly Arg Arg Thr Arg Ala Leu Arg Val Ser His
                    3365              3370              3375
Ala Phe His Ser Ala His Met Asp Gly Met Leu Asp Gly Phe Arg Ala
                    3380              3385              3390
Val Leu Glu Thr Val Glu Phe Arg Arg Pro Ser Leu Thr Val Val Ser
          3395                    3400              3405
Asn Val Thr Gly Leu Ala Ala Gly Pro Asp Asp Leu Cys Asp Pro Glu
          3410                    3415              3420
Tyr Trp Val Arg His Val Arg Gly Thr Val Arg Phe Leu Asp Gly Val
3425                    3430              3435                3440
Arg Val Leu Arg Asp Leu Gly Val Arg Thr Cys Leu Glu Leu Gly Pro
                    3445                    3450              3455
Asp Gly Val Leu Thr Ala Met Ala Ala Asp Gly Leu Ala Asp Thr Pro
          3460              3465              3470
Ala Asp Ser Ala Ala Gly Ser Pro Val Gly Ser Pro Ala Gly Ser Pro
     3475              3480              3485
Ala Asp Ser Ala Ala Gly Ala Leu Arg Pro Arg Pro Leu Leu Val Ala
     3490              3495              3500
Leu Leu Arg Arg Lys Arg Ser Glu Thr Glu Thr Val Ala Asp Ala Leu
3505              3510              3515                3520
Gly Arg Ala His Ala His Gly Thr Gly Pro Asp Trp His Ala Trp Phe
                    3525                    3530              3535
Ala Gly Ser Gly Ala His Arg Val Asp Leu Pro Thr Tyr Ser Phe Arg
          3540              3545              3550
Arg Asp Arg Tyr Trp Leu Asp Ala Pro Ala Ala Asp Thr Ala Val Asp
          3555              3560              3565
Thr Ala Gly Leu Gly Leu Gly Thr Ala Asp His Pro Leu Leu Gly Ala
     3570              3575              3580
Val Val Ser Leu Pro Asp Arg Asp Gly Leu Leu Leu Thr Gly Arg Leu
3585              3590              3595                3600
Ser Leu Arg Thr His Pro Trp Leu Ala Asp His Ala Val Leu Gly Ser
          3605              3610              3615
Val Leu Leu Pro Gly Ala Ala Met Val Glu Leu Ala Ala His Ala Ala
          3620              3625              3630
Glu Ser Ala Gly Leu Arg Asp Val Arg Glu Leu Thr Leu Leu Glu Pro
          3635              3640              3645
Leu Val Leu Pro Glu His Gly Gly Val Glu Leu Arg Val Thr Val Gly
     3650              3655              3660
Ala Pro Ala Gly Glu Pro Gly Gly Glu Ser Ala Gly Asp Gly Ala Arg
3665              3670              3675                3680
Pro Val Ser Leu His Ser Arg Leu Ala Asp Ala Pro Ala Gly Thr Ala
               3685              3690              3695
Trp Ser Cys His Ala Thr Gly Leu Leu Ala Thr Asp Arg Pro Glu Leu
          3700              3705              3710
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88

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Pro Val Ala Pro Asp Arg Ala Ala Met Trp Pro Pro Gln Gly Ala Glu
        3715                3720                3725
Glu Val Pro Leu Asp Gly Leu Tyr Glu Arg Leu Asp Gly Asn Gly Leu
        3730                3735                3740
Ala Phe Gly Pro Leu Phe Gln Gly Leu Asn Ala Val Trp Arg Tyr Glu
3745                3750                3755                3760
Gly Glu Val Phe Ala Asp Ile Ala Leu Pro Ala Thr Thr Asn Ala Thr
                3765                3770                3775
Ala Pro Ala Thr Ala Asn Gly Gly Gly Ser Ala Ala Ala Ala Pro Tyr
            3780                3785                3790
Gly Ile His Pro Ala Leu Leu Asp Ala Ser Leu His Ala Ile Ala Val
        3795                3800                3805
Gly Gly Leu Val Asp Glu Pro Glu Leu Val Arg Val Pro Phe His Trp
        3810                3815                3820
Ser Gly Val Thr Val His Ala Ala Gly Ala Ala Ala Ala Arg Val Arg
3825                3830                3835                3840
Leu Ala Ser Ala Gly Thr Asp Ala Val Ser Leu Ser Leu Thr Asp Gly
            3845                3850                3855
Glu Gly Arg Pro Leu Val Ser Val Glu Arg Leu Thr Leu Arg Pro Val
        3860                3865                3870
Thr Ala Asp Gln Ala Ala Ala Ser Arg Val Gly Gly Leu Met His Arg
        3875                3880                3885
Val Ala Trp Arg Pro Tyr Ala Leu Ala Ser Ser Gly Glu Gln Asp Pro
    3890                3895                3900
His Ala Thr Ser Tyr Gly Pro Thr Ala Val Leu Gly Lys Asp Glu Leu
3905                3910                3915                3920
Lys Val Ala Ala Ala Leu Glu Ser Ala Gly Val Glu Val Gly Leu Tyr
            3925                3930                3935
Pro Asp Leu Ala Ala Leu Ser Gln Asp Val Ala Ala Gly Ala Pro Ala
        3940                3945                3950
Pro Arg Thr Val Leu Ala Pro Leu Pro Ala Gly Pro Ala Asp Gly Gly
        3955                3960                3965
Ala Glu Gly Val Arg Gly Thr Val Ala Arg Thr Leu Glu Leu Leu Gln
    3970                3975                3980
Ala Trp Leu Ala Asp Glu His Leu Ala Gly Thr Arg Leu Leu Leu Val
3985                3990                3995                4000
Thr Arg Gly Ala Val Arg Asp Pro Glu Gly Ser Gly Ala Asp Asp Gly
            4005                4010                4015
Gly Glu Asp Leu Ser His Ala Ala Ala Trp Gly Leu Val Arg Thr Ala
        4020                4025                4030
Gln Thr Glu Asn Pro Gly Arg Phe Gly Leu Leu Asp Leu Ala Asp Asp
        4035                4040                4045
Ala Ser Ser Tyr Arg Thr Leu Pro Ser Val Leu Ser Asp Ala Gly Leu
    4050                4055                4060
Arg Asp Glu Pro Gln Leu Ala Leu His Asp Gly Thr Ile Arg Leu Ala
4065                4070                4075                4080
Arg Leu Ala Ser Val Arg Pro Glu Thr Gly Thr Ala Ala Pro Ala Leu
            4085                4090                4095
Ala Pro Glu Gly Thr Val Leu Leu Thr Gly Gly Thr Gly Gly Leu Gly
            4100                4105                4110
Gly Leu Val Ala Arg His Val Val Gly Glu Trp Gly Val Arg Arg Leu
        4115                4120                4125
Leu Leu Val Ser Arg Arg Gly Thr Asp Ala Pro Gly Ala Asp Glu Leu
    4130                4135                4140
Val His Glu Leu Glu Ala Leu Gly Ala Asp Val Ser Val Ala Ala Cys
4145                4150                4155                4160
Asp Val Ala Asp Arg Glu Ala Leu Thr Ala Val Leu Asp Ala Ile Pro
            4165                4170                4175
Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val Leu Ser
        4180                4185                4190
Asp Gly Thr Leu Pro Ser Met Thr Thr Glu Asp Val Glu His Val Leu
        4195                4200                4205
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89

Arg Pro Lys Val Asp Ala Ala Phe Leu Leu Asp Glu Leu Thr Ser Thr
    4210   4215   4220
Pro Ala Tyr Asp Leu Ala Ala Phe Val Met Phe Ser Ser Ala Ala Ala
4225   4230   4235   4240
Val Phe Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Ala Asn Ala Thr
                4245   4250   4255
Leu Asp Ala Leu Ala Trp Arg Arg Arg Ala Ala Gly Leu Pro Ala Leu
                4260   4265   4270
Ser Leu Gly Trp Gly Leu Trp Ala Glu Thr Ser Gly Met Thr Gly Glu
                4275   4280   4285
Leu Gly Gln Ala Asp Leu Arg Arg Met Ser Arg Ala Gly Ile Gly Gly
        4290   4295   4300
Ile Ser Asp Ala Glu Gly Ile Ala Leu Leu Asp Ala Ala Leu Arg Asp
4305   4310   4315   4320
Asp Arg His Pro Val Leu Leu Pro Leu Arg Leu Asp Ala Ala Gly Leu
                4325   4330   4335
Arg Asp Ala Ala Gly Asn Asp Pro Ala Gly Ile Pro Ala Leu Phe Arg
        4340   4345   4350
Asp Val Val Gly Ala Arg Thr Val Arg Ala Arg Pro Ser Ala Ala Ser
        4355   4360   4365
Ala Ser Thr Thr Ala Gly Thr Ala Gly Thr Pro Gly Thr Ala Asp Gly
    4370   4375   4380
Ala Ala Glu Thr Ala Ala Val Thr Leu Ala Asp Arg Ala Ala Thr Val
4385   4390   4395   4400
Asp Gly Pro Ala Arg Gln Arg Leu Leu Leu Glu Phe Val Val Gly Glu
                4405   4410   4415
Val Ala Glu Val Leu Gly His Ala Arg Gly His Arg Ile Asp Ala Glu
        4420   4425   4430
Arg Gly Phe Leu Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu
        4435   4440   4445
Arg Asn Arg Leu Asn Ser Ala Gly Gly Leu Ala Leu Pro Ala Thr Leu
    4450   4455   4460
Val Phe Asp His Pro Ser Pro Ala Ala Leu Ala Ser His Leu Asp Ala
4465   4470   4475   4480
Glu Leu Pro Arg Gly Ala Ser Asp Gln Asp Gly Ala Gly Asn Arg Asn
                4485   4490   4495
Gly Asn Glu Asn Gly Thr Thr Ala Ser Arg Ser Thr Ala Glu Thr Asp
        4500   4505   4510
Ala Leu Leu Ala Gln Leu Thr Arg Leu Glu Gly Ala Leu Val Leu Thr
        4515   4520   4525
Gly Leu Ser Asp Ala Pro Gly Ser Glu Glu Val Leu Glu His Leu Arg
    4530   4535   4540
Ser Leu Arg Ser Met Val Thr Gly Glu Thr Gly Thr Gly Thr Ala Ser
4545   4550   4555   4560
Gly Ala Pro Asp Gly Ala Gly Ser Gly Ala Glu Asp Arg Pro Trp Ala
                4565   4570   4575
Ala Gly Asp Gly Ala Gly Gly Gly Ser Glu Asp Gly Ala Gly Val Pro
                4580   4585   4590
Asp Phe Met Asn Ala Ser Ala Glu Glu Leu Phe Gly Leu Leu Asp Gln
        4595   4600   4605
Asp Pro Ser Thr Asp
    4610

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<211> 11220
<212> DNA
<213> Streptomyces venezuelae

<400> 32
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cacgaggccc gtggccgcct ccgcgagctg gaggcgaagg cgggcgagcc ggtggcgatc   120
gtcggcatgg cctgccgcct gcccggcggc gtcgcctcgc ccgaggacct gtggcggctg   180

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gtggccggcg  gcgaggacgc  gatctcggag  ttcccccagg  accgcggctg  ggacgtggag     240
ggcctgtacg  acccgaaccc  ggaggccacg  ggcaagagtt  acgcccgcga  ggccggattc     300
ctgtacgagg  cgggcgagtt  cgacgccgac  ttcttcggga  tctcgccgcg  cgaggccctc     360
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Gly Leu Tyr Asp Pro Asn Pro Glu Ala Thr Gly Lys Ser Tyr Ala Arg
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94

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Gln Gly Arg Thr Asp Ala Ala Asp Pro Gly Ala Val Ala Arg Val Leu
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Ala Gly Gly Arg Ala Glu Phe Glu His Arg Ala Val Val Leu Gly Thr
        530                 535                 540
Gly Gln Asp Asp Phe Ala Gln Ala Leu Thr Ala Pro Glu Gly Leu Ile
545                 550                 555                 560
Arg Gly Thr Pro Ser Asp Val Gly Arg Val Ala Phe Val Phe Pro Gly
                565                 570                 575
Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp Val Ser
        580                 585                 590
Lys Glu Phe Ala Ala Ala Met Ala Glu Cys Glu Ser Ala Leu Ser Arg
        595                 600                 605
Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro Gly Ala
610                 615                 620
Pro Thr Leu Glu Arg Val Asp Val Val Gln Pro Val Thr Phe Ala Val
625                 630                 635                 640
Met Val Ser Leu Ala Lys Val Trp Gln His Gly Val Thr Pro Gln
        645                 650                 655
Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala
        660                 665                 670
Gly Ala Leu Thr Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser
        675                 680                 685
Lys Ser Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Ile Ser Leu
        690                 695                 700
Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg Ile Glu Asn Leu His Gly
705                 710                 715                 720
Leu Ser Ile Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly
                725                 730                 735
Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala Asp Gly
        740                 745                 750
Val Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser Ala His
        755                 760                 765
Val Glu Thr Ile Glu Ser Glu Leu Ala Glu Val Leu Ala Gly Leu Ser
        770                 775                 780
Pro Arg Thr Pro Glu Val Pro Phe Phe Ser Thr Leu Glu Gly Ala Trp
785                 790                 795                 800
Ile Thr Glu Pro Val Leu Asp Gly Thr Tyr Trp Tyr Arg Asn Leu Arg
                805                 810                 815
His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu
        820                 825                 830
Gly Phe Thr His Phe Ile Glu Val Ser Ala His Pro Val Leu Thr Met
        835                 840                 845
Thr Leu Pro Glu Thr Val Thr Gly Leu Gly Thr Leu Arg Arg Glu Gln
        850                 855                 860
Gly Gly Gln Glu Arg Leu Val Thr Ser Leu Ala Glu Ala Trp Thr Asn
865                 870                 875                 880
Gly Leu Thr Ile Asp Trp Ala Pro Val Leu Pro Thr Ala Thr Gly His
                885                 890                 895
His Pro Glu Leu Pro Thr Tyr Ala Phe Gln Arg Arg His Tyr Trp Leu
        900                 905                 910
His Asp Ser Pro Ala Val Gln Gly Ser Val Gln Asp Ser Trp Arg Tyr
        915                 920                 925
```

95

```
Arg Ile Asp Trp Lys Arg Leu Ala Val Ala Asp Ala Ser Glu Arg Ala
    930             935             940
Gly Leu Ser Gly Arg Trp Leu Val Val Val Pro Glu Asp Arg Ser Ala
945             950             955                         960
Glu Ala Ala Pro Val Leu Ala Ala Leu Ser Gly Ala Gly Ala Asp Pro
                965             970             975
Val Gln Leu Asp Val Ser Pro Leu Gly Asp Arg Gln Arg Leu Ala Ala
            980             985             990
Thr Leu Gly Glu Ala Leu Ala Ala Ala Gly Gly Ala Val Asp Gly Val
        995             1000            1005
Leu Ser Leu Leu Ala Trp Asp Glu Ser Ala His Pro Gly His Pro Ala
    1010            1015            1020
Pro Phe Thr Arg Gly Thr Gly Ala Thr Leu Thr Leu Val Gln Ala Leu
1025            1030            1035                        1040
Glu Asp Ala Gly Val Ala Ala Pro Leu Trp Cys Val Thr His Gly Ala
            1045            1050            1055
Val Ser Val Gly Arg Ala Asp His Val Thr Ser Pro Ala Gln Ala Met
        1060            1065            1070
Val Trp Gly Met Gly Arg Val Ala Ala Leu Glu His Pro Glu Arg Trp
    1075            1080            1085
Gly Gly Leu Ile Asp Leu Pro Ser Asp Ala Asp Arg Ala Ala Leu Asp
    1090            1095            1100
Arg Met Thr Thr Val Leu Ala Gly Gly Thr Gly Glu Asp Gln Val Ala
1105            1110            1115                        1120
Val Arg Ala Ser Gly Leu Leu Ala Arg Arg Leu Val Arg Ala Ser Leu
            1125            1130            1135
Pro Ala His Gly Thr Ala Ser Pro Trp Trp Gln Ala Asp Gly Thr Val
        1140            1145            1150
Leu Val Thr Gly Ala Glu Glu Pro Ala Ala Ala Glu Ala Ala Arg Arg
        1155            1160            1165
Leu Ala Arg Asp Gly Ala Gly His Leu Leu Leu His Thr Thr Pro Ser
    1170            1175            1180
Gly Ser Glu Gly Ala Glu Gly Thr Ser Gly Ala Ala Glu Asp Ser Gly
1185            1190            1195                        1200
Leu Ala Gly Leu Val Ala Glu Leu Ala Asp Leu Gly Ala Thr Ala Thr
            1205            1210            1215
Val Val Thr Cys Asp Leu Thr Asp Ala Glu Ala Ala Ala Arg Leu Leu
        1220            1225            1230
Ala Gly Val Ser Asp Ala His Pro Leu Ser Ala Val Leu His Leu Pro
        1235            1240            1245
Pro Thr Val Asp Ser Glu Pro Leu Ala Ala Thr Asp Ala Asp Ala Leu
    1250            1255            1260
Ala Arg Val Val Thr Ala Lys Ala Thr Ala Ala Leu His Leu Asp Arg
1265            1270            1275                        1280
Leu Leu Arg Glu Ala Ala Ala Ala Gly Gly Arg Pro Pro Val Leu Val
            1285            1290            1295
Leu Phe Ser Ser Val Ala Ala Ile Trp Gly Gly Ala Gly Gln Gly Ala
            1300            1305            1310
Tyr Ala Ala Gly Thr Ala Phe Leu Asp Ala Leu Ala Gly Gln His Arg
        1315            1320            1325
Ala Asp Gly Pro Thr Val Thr Ser Val Ala Trp Ser Pro Trp Glu Gly
    1330            1335            1340
Ser Arg Val Thr Glu Gly Ala Thr Gly Glu Arg Leu Arg Arg Leu Gly
1345            1350            1355                        1360
Leu Arg Pro Leu Ala Pro Ala Thr Ala Leu Thr Ala Leu Asp Thr Ala
            1365            1370            1375
Leu Gly His Gly Asp Thr Ala Val Thr Ile Ala Asp Val Asp Trp Ser
        1380            1385            1390
Ser Phe Ala Pro Gly Phe Thr Thr Ala Arg Pro Gly Thr Leu Leu Ala
    1395            1400            1405
Asp Leu Pro Glu Ala Arg Arg Ala Leu Asp Glu Gln Gln Ser Thr Thr
    1410            1415            1420
```

96

```
Ala Ala Asp Asp Thr Val Leu Ser Arg Glu Leu Gly Ala Leu Thr Gly
1425            1430                1435                1440
Ala Glu Gln Gln Arg Arg Met Gln Glu Leu Val Arg Glu His Leu Ala
                1445                1450                1455
Val Val Leu Asn His Pro Ser Pro Glu Ala Val Asp Thr Gly Arg Ala
            1460                1465                1470
Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn
            1475                1480                1485
Arg Leu Lys Asn Ala Thr Gly Leu Ala Leu Pro Ala Thr Leu Val Phe
        1490                1495                1500
Asp Tyr Pro Thr Pro Arg Thr Leu Ala Glu Phe Leu Leu Ala Glu Ile
1505                1510                1515                1520
Leu Gly Glu Gln Ala Gly Ala Gly Glu Gln Leu Pro Val Asp Gly Gly
                1525                1530                1535
Val Asp Asp Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu Pro
            1540                1545                1550
Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Gly Gly
            1555                1560                1565
Glu Asp Ala Ile Ser Gly Phe Pro Gln Asp Arg Gly Trp Asp Val Glu
        1570                1575                1580
Gly Leu Tyr Asp Pro Asp Pro Asp Ala Ser Gly Arg Thr Tyr Cys Arg
1585                1590                1595                1600
Ala Gly Gly Phe Leu Asp Glu Ala Gly Glu Phe Asp Ala Asp Phe Phe
                1605                1610                1615
Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu
        1620                1625                1630
Leu Leu Glu Thr Ser Trp Glu Ala Val Glu Asp Ala Gly Ile Asp Pro
        1635                1640                1645
Thr Ser Leu Gln Gly Gln Gln Val Gly Val Phe Ala Gly Thr Asn Gly
        1650                1655                1660
Pro His Tyr Glu Pro Leu Leu Arg Asn Thr Ala Glu Asp Leu Glu Gly
1665                1670                1675                1680
Tyr Val Gly Thr Gly Asn Ala Ala Ser Ile Met Ser Gly Arg Val Ser
                1685                1690                1695
Tyr Thr Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys
        1700                1705                1710
Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala Leu Arg Lys
        1715                1720                1725
Gly Glu Cys Gly Leu Ala Leu Ala Gly Gly Val Thr Val Met Ser Thr
    1730                1735                1740
Pro Thr Thr Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Glu Asp
1745                1750                1755                1760
Gly Arg Ser Lys Ala Phe Ala Ala Ser Ala Asp Gly Phe Gly Pro Ala
            1765                1770                1775
Glu Gly Val Gly Met Leu Leu Val Glu Arg Leu Ser Asp Ala Arg Arg
            1780                1785                1790
Asn Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln
        1795                1800                1805
Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln
    1810                1815                1820
Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Thr Thr Ala Asp
1825                1830                1835                1840
Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro
            1845                1850                1855
Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Gly Arg Asp Thr
        1860                1865                1870
Glu Gln Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Ile Gly His Thr
        1875                1880                1885
Gln Ala Ala Ala Gly Val Ser Gly Ile Ile Lys Met Val Gln Ala Met
    1890                1895                1900
Arg His Gly Val Leu Pro Lys Thr Leu His Val Asp Arg Pro Ser Asp
1905                1910                1915                1920
```

97

Gln Ile Asp Trp Ser Ala Gly Thr Val Glu Leu Leu Thr Glu Ala Met
                1925   1930   1935
Asp Trp Pro Arg Lys Gln Glu Gly Gly Leu Arg Arg Ala Ala Val Ser
                1940   1945   1950
Ser Phe Gly Ile Ser Gly Thr Asn Ala His Ile Val Leu Glu Glu Ala
                1955   1960   1965
Pro Val Asp Glu Asp Ala Pro Ala Asp Glu Pro Ser Val Gly Gly Val
            1970   1975   1980
Val Pro Trp Leu Val Ser Ala Lys Thr Pro Ala Ala Leu Asp Ala Gln
1985   1990   1995   2000
Ile Gly Arg Leu Ala Ala Phe Ala Ser Gln Gly Arg Thr Asp Ala Ala
                2005   2010   2015
Asp Pro Gly Ala Val Ala Arg Val Leu Ala Gly Gly Arg Ala Gln Phe
                2020   2025   2030
Glu His Arg Ala Val Ala Leu Gly Thr Gly Gln Asp Asp Leu Ala Ala
            2035   2040   2045
Ala Leu Ala Ala Pro Glu Gly Leu Val Arg Gly Val Ala Ser Gly Val
            2050   2055   2060
Gly Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly
2065   2070   2075   2080
Met Gly Ala Glu Leu Leu Asp Val Ser Lys Glu Phe Ala Ala Ala Met
                2085   2090   2095
Ala Glu Cys Glu Ala Ala Leu Ala Pro Tyr Val Asp Trp Ser Leu Glu
            2100   2105   2110
Ala Val Val Arg Gln Ala Pro Gly Ala Pro Thr Leu Glu Arg Val Asp
            2115   2120   2125
Val Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val
            2130   2135   2140
Trp Gln His His Gly Val Thr Pro Gln Ala Val Val Gly His Ser Gln
2145   2150   2155   2160
Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Ser Leu Asp Asp
                2165   2170   2175
Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Gly Ala His Leu
            2180   2185   2190
Ala Gly Gln Gly Gly Met Leu Ser Leu Ala Leu Ser Glu Ala Ala Val
            2195   2200   2205
Val Glu Arg Leu Ala Gly Phe Asp Gly Leu Ser Val Ala Ala Val Asn
2210   2215   2220
Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Gln Glu
2225   2230   2235   2240
Leu Ala Gln Ala Cys Glu Ala Asp Gly Val Arg Ala Arg Ile Ile Pro
            2245   2250   2255
Val Asp Tyr Ala Ser His Ser Ala His Val Glu Thr Ile Glu Ser Glu
            2260   2265   2270
Leu Ala Asp Val Leu Ala Gly Leu Ser Pro Gln Thr Pro Gln Val Pro
            2275   2280   2285
Phe Phe Ser Thr Leu Glu Gly Ala Trp Ile Thr Glu Pro Ala Leu Asp
            2290   2295   2300
Gly Gly Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro
2305   2310   2315   2320
Ala Val Glu Thr Leu Ala Thr Asp Glu Gly Phe Thr His Phe Val Glu
            2325   2330   2335
Val Ser Ala His Pro Val Leu Thr Met Ala Leu Pro Glu Thr Val Thr
            2340   2345   2350
Gly Leu Gly Thr Leu Arg Arg Asp Asn Gly Gly Gln His Arg Leu Thr
            2355   2360   2365
Thr Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Val Asp Trp Ala
            2370   2375   2380
Ser Leu Leu Pro Thr Thr Thr Thr His Pro Asp Leu Pro Thr Tyr Ala
2385   2390   2395   2400
Phe Gln Thr Glu Arg Tyr Trp Pro Gln Pro Asp Leu Ser Ala Ala Gly
                2405   2410   2415

98

```
Asp Ile Thr Ser Ala Gly Leu Gly Ala Ala Glu His Pro Leu Leu Gly
        2420                    2425              2430
Ala Ala Val Ala Leu Ala Asp Ser Asp Gly Cys Leu Leu Thr Gly Ser
        2435                    2440              2445
Leu Ser Leu Arg Thr His Pro Trp Leu Ala Asp His Ala Val Ala Gly
        2450                    2455              2460
Thr Val Leu Leu Pro Gly Thr Ala Phe Val Glu Leu Ala Phe Arg Ala
2465                    2470              2475                    2480
Gly Asp Gln Val Gly Cys Asp Leu Val Glu Glu Leu Thr Leu Asp Ala
                2485                    2490              2495
Pro Leu Val Leu Pro Arg Arg Gly Ala Val Arg Val Gln Leu Ser Val
                2500                    2505              2510
Gly Ala Ser Asp Glu Ser Gly Arg Arg Thr Phe Gly Leu Tyr Ala His
                2515                    2520              2525
Pro Glu Asp Ala Pro Gly Glu Ala Glu Trp Thr Arg His Ala Thr Gly
        2530                    2535              2540
Val Leu Ala Ala Arg Ala Asp Arg Thr Ala Pro Val Ala Asp Pro Glu
2545                    2550              2555                    2560
Ala Trp Pro Pro Pro Gly Ala Glu Pro Val Asp Val Asp Gly Leu Tyr
                2565                    2570              2575
Glu Arg Phe Ala Ala Asn Gly Tyr Gly Tyr Gly Pro Leu Phe Gln Gly
                2580                    2585              2590
Val Arg Gly Val Trp Arg Arg Gly Asp Glu Val Phe Ala Asp Val Ala
                2595                    2600              2605
Leu Pro Ala Glu Val Ala Gly Ala Glu Gly Ala Arg Phe Gly Leu His
        2610                    2615              2620
Pro Ala Leu Leu Asp Ala Ala Val Gln Ala Ala Gly Ala Gly Arg Gly
2625                    2630              2635                    2640
Val Arg Arg Gly His Ala Ala Ala Val Arg Leu Glu Arg Asp Leu Leu
                2645                    2650              2655
Tyr Ala Val Gly Ala Thr Ala Leu Arg Val Arg Leu Ala Pro Ala Gly
                2660                    2665              2670
Pro Asp Thr Val Ser Val Ser Ala Ala Asp Ser Ser Gly Gln Pro Val
        2675                    2680              2685
Phe Ala Ala Asp Ser Leu Thr Val Leu Pro Val Asp Pro Ala Gln Leu
        2690                    2695              2700
Ala Ala Phe Ser Asp Pro Thr Leu Asp Ala Leu His Leu Leu Glu Trp
2705                    2710              2715                    2720
Thr Ala Trp Asp Gly Ala Ala Gln Ala Leu Pro Gly Ala Val Val Leu
                2725                    2730              2735
Gly Gly Asp Ala Asp Gly Leu Ala Ala Ala Leu Arg Ala Gly Gly Thr
        2740                    2745              2750
Glu Val Leu Ser Phe Pro Asp Leu Thr Asp Leu Val Glu Ala Val Asp
        2755                    2760              2765
Arg Gly Glu Thr Pro Ala Pro Ala Thr Val Leu Val Ala Cys Pro Ala
        2770                    2775              2780
Ala Gly Pro Asp Gly Pro Glu His Val Arg Glu Ala Leu His Gly Ser
2785                    2790              2795                    2800
Leu Ala Leu Met Gln Ala Trp Leu Ala Asp Glu Arg Phe Thr Asp Gly
                2805                    2810              2815
Arg Leu Val Leu Val Thr Arg Asp Ala Val Ala Ala Arg Ser Gly Asp
        2820                    2825              2830
Gly Leu Arg Ser Thr Gly Gln Ala Ala Val Trp Gly Leu Gly Arg Ser
        2835                    2840              2845
Ala Gln Thr Glu Ser Pro Gly Arg Phe Val Leu Leu Asp Leu Ala Gly
        2850                    2855              2860
Glu Ala Arg Thr Ala Gly Asp Ala Thr Ala Gly Asp Gly Leu Thr Thr
2865                    2870              2875                    2880
Gly Asp Ala Thr Val Gly Gly Thr Ser Gly Asp Ala Ala Leu Gly Ser
                2885                    2890              2895
Ala Leu Ala Thr Ala Leu Gly Ser Gly Glu Pro Gln Leu Ala Leu Arg
        2900                    2905              2910
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99

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Asp Gly Ala Leu Leu Val Pro Arg Leu Ala Arg Ala Ala Ala Pro Ala
        2915              2920             2925
Ala Ala Asp Gly Leu Ala Ala Ala Asp Gly Leu Ala Ala Leu Pro Leu
        2930              2935             2940
Pro Ala Ala Pro Ala Leu Trp Arg Leu Glu Pro Gly Thr Asp Gly Ser
2945              2950             2955                 2960
Leu Glu Ser Leu Thr Ala Ala Pro Gly Asp Ala Glu Thr Leu Ala Pro
        2965              2970             2975
Glu Pro Leu Gly Pro Gly Gln Val Arg Ile Ala Ile Arg Ala Thr Gly
        2980              2985             2990
Leu Asn Phe Arg Asp Val Leu Ile Ala Leu Gly Met Tyr Pro Asp Pro
        2995              3000             3005
Ala Leu Met Gly Thr Glu Gly Ala Gly Val Val Thr Ala Thr Gly Pro
        3010              3015             3020
Gly Val Thr His Leu Ala Pro Gly Asp Arg Val Met Gly Leu Leu Ser
3025              3030             3035                 3040
Gly Ala Tyr Ala Pro Val Val Val Ala Asp Ala Arg Thr Val Ala Arg
        3045              3050             3055
Met Pro Glu Gly Trp Thr Phe Ala Gln Gly Ala Ser Val Pro Val Val
        3060              3065             3070
Phe Leu Thr Ala Val Tyr Ala Leu Arg Asp Leu Ala Asp Val Lys Pro
        3075              3080             3085
Gly Glu Arg Leu Leu Val His Ser Ala Ala Gly Gly Val Gly Met Ala
        3090              3095             3100
Ala Val Gln Leu Ala Arg His Trp Gly Val Glu Val His Gly Thr Ala
3105              3110             3115                 3120
Ser His Gly Lys Trp Asp Ala Leu Arg Ala Leu Gly Leu Asp Asp Ala
        3125              3130             3135
His Ile Ala Ser Ser Arg Thr Leu Asp Phe Glu Ser Ala Phe Arg Ala
        3140              3145             3150
Ala Ser Gly Gly Ala Gly Met Asp Val Val Leu Asn Ser Leu Ala Arg
        3155              3160             3165
Glu Phe Val Asp Ala Ser Leu Arg Leu Leu Gly Pro Gly Gly Arg Phe
        3170              3175             3180
Val Glu Met Gly Lys Thr Asp Val Arg Asp Ala Glu Arg Val Ala Ala
3185              3190             3195                 3200
Asp His Pro Gly Val Gly Tyr Arg Ala Phe Asp Leu Gly Glu Ala Gly
        3205              3210             3215
Pro Glu Arg Ile Gly Glu Met Leu Ala Glu Val Ile Ala Leu Phe Glu
        3220              3225             3230
Asp Gly Val Leu Arg His Leu Pro Val Thr Thr Trp Asp Val Arg Arg
        3235              3240             3245
Ala Arg Asp Ala Phe Arg His Val Ser Gln Ala Arg His Thr Gly Lys
        3250              3255             3260
Val Val Leu Thr Met Pro Ser Gly Leu Asp Pro Glu Gly Thr Val Leu
3265              3270    ‾        3275                 3280
Leu Thr Gly Gly Thr Gly Ala Leu Gly Gly Ile Val Ala Arg His Val
        3285              3290             3295
Val Gly Glu Trp Gly Val Arg Arg Leu Leu Leu Val Ser Arg Arg Gly
        3300              3305             3310
Thr Asp Ala Pro Gly Ala Gly Glu Leu Val His Glu Leu Glu Ala Leu
        3315              3320             3325
Gly Ala Asp Val Ser Val Ala Ala Cys Asp Val Ala Asp Arg Glu Ala
        3330              3335             3340
Leu Thr Ala Val Leu Asp Ser Ile Pro Ala Glu His Pro Leu Thr Ala
3345              3350             3355                 3360
Val Val His Thr Ala Gly Val Leu Ser Asp Gly Thr Leu Pro Ser Met
        3365              3370             3375
Thr Ala Glu Asp Val Glu His Val Leu Arg Pro Lys Val Asp Ala Ala
        3380              3385             3390
Phe Leu Leu Asp Glu Leu Thr Ser Thr Pro Gly Tyr Asp Leu Ala Ala
        3395              3400             3405
```

100

```
Phe Val Met Phe Ser Ser Ala Ala Ala Val Phe Gly Gly Ala Gly Gln
    3410            3415            3420
Gly Ala Tyr Ala Ala Ala Asn Ala Thr Leu Asp Ala Leu Ala Trp Arg
3425            3430            3435            3440
Arg Arg Thr Ala Gly Leu Pro Ala Leu Ser Leu Gly Trp Gly Leu Trp
            3445            3450            3455
Ala Glu Thr Ser Gly Met Thr Gly Gly Leu Ser Asp Thr Asp Arg Ser
            3460            3465            3470
Arg Leu Ala Arg Ser Gly Ala Thr Pro Met Asp Ser Glu Leu Thr Leu
            3475            3480            3485
Ser Leu Leu Asp Ala Ala Met Arg Arg Asp Asp Pro Ala Leu Val Pro
            3490            3495            3500
Ile Ala Leu Asp Val Ala Ala Leu Arg Ala Gln Gln Arg Asp Gly Met
3505            3510            3515            3520
Leu Ala Pro Leu Leu Ser Gly Leu Thr Arg Gly Ser Arg Val Gly Gly
            3525            3530            3535
Ala Pro Val Asn Gln Arg Arg Ala Ala Ala Gly Gly Ala Gly Glu Ala
            3540            3545            3550
Asp Thr Asp Leu Gly Gly Arg Leu Ala Ala Met Thr Pro Asp Asp Arg
            3555            3560            3565
Val Ala His Leu Arg Asp Leu Val Arg Thr His Val Ala Thr Val Leu
            3570            3575            3580
Gly His Gly Thr Pro Ser Arg Val Asp Leu Glu Arg Ala Phe Arg Asp
3585            3590            3595            3600
Thr Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu Asn
            3605            3610            3615
Ala Ala Thr Gly Leu Arg Leu Pro Ala Thr Leu Val Phe Asp His Pro
            3620            3625            3630
Thr Pro Gly Glu Leu Ala Gly His Leu Leu Asp Glu Leu Ala Thr Ala
            3635            3640            3645
Ala Gly Gly Ser Trp Ala Glu Gly Thr Gly Ser Gly Asp Thr Ala Ser
            3650            3655            3660
Ala Thr Asp Arg Gln Thr Thr Ala Ala Leu Ala Glu Leu Asp Arg Leu
3665            3670            3675            3680
Glu Gly Val Leu Ala Ser Leu Ala Pro Ala Ala Gly Gly Arg Pro Glu
            3685            3690            3695
Leu Ala Ala Arg Leu Arg Ala Leu Ala Ala Ala Leu Gly Asp Asp Gly
            3700            3705            3710
Asp Asp Ala Thr Asp Leu Asp Glu Ala Ser Asp Asp Asp Leu Phe Ser
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Phe Ile Asp Lys Glu Leu Gly Asp Ser Asp Phe
    3730            3735


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gccggggacg gggacgcgat ctcggagttc cgcaggacc gcggctggga cgtggagggg       240
ctgtacgacc ccgacccgga cgcgtccggc aggacgtact gccggtccgg cggattcctg      300
cacgacgccg gcgagttcga cgccgacttc ttcgggatct cgccgcgcga ggccctcgcc      360
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101

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<210> 35
<211> 1562
<212> PRT
<213> Streptomyces venezuelae

<400> 35

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Thr	His	Glu	Pro	Val	Ala	Ile	Val	Gly	Met	Ala	Cys	Arg	Leu	Pro	Gly
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Gly	Val	Ala	Ser	Pro	Glu	Asp	Leu	Trp	Gln	Leu	Val	Ala	Gly	Asp	Gly
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Asp	Ala	Ile	Ser	Glu	Phe	Pro	Gln	Asp	Arg	Gly	Trp	Asp	Val	Glu	Gly
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Leu	Tyr	Asp	Pro	Asp	Pro	Asp	Ala	Ser	Gly	Arg	Thr	Tyr	Cys	Arg	Ser
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Gly	Gly	Phe	Leu	His	Asp	Ala	Gly	Glu	Phe	Asp	Ala	Asp	Phe	Phe	Gly
			100					105					110		
Ile	Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg	Leu	Ser
		115					120					125			
Leu	Thr	Thr	Ala	Trp	Glu	Ala	Ile	Glu	Ser	Ala	Gly	Ile	Asp	Pro	Thr
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Ala	Leu	Lys	Gly	Ser	Gly	Leu	Gly	Val	Phe	Val	Gly	Gly	Trp	His	Thr
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Gly	Tyr	Thr	Ser	Gly	Gln	Thr	Thr	Ala	Val	Gln	Ser	Pro	Glu	Leu	Glu
			165					170					175		
Gly	His	Leu	Val	Ser	Gly	Ala	Ala	Leu	Gly	Phe	Leu	Ser	Gly	Arg	Ile
			180					185					190		
Ala	Tyr	Val	Leu	Gly	Thr	Asp	Gly	Pro	Ala	Leu	Thr	Val	Asp	Thr	Ala
		195					200					205			
Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Val	Gln	Ala	Leu	Arg
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Lys	Gly	Glu	Cys	Asp	Met	Ala	Leu	Ala	Gly	Gly	Val	Thr	Val	Met	Pro
225					230					235					240
Asn	Ala	Asp	Leu	Phe	Val	Gln	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	Ala
			245					250					255		
Asp	Gly	Arg	Ser	Lys	Ala	Phe	Ala	Thr	Ser	Ala	Asp	Gly	Phe	Gly	Pro
		260					265					270			
Ala	Glu	Gly	Ala	Gly	Val	Leu	Leu	Val	Glu	Arg	Leu	Ser	Asp	Ala	Arg
		275					280					285			
Arg	Asn	Gly	His	Arg	Ile	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn
	290					295					300				
Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	His	Gly	Pro	Ser	Gln
305					310					315					320
Gln	Arg	Val	Ile	Arg	Arg	Ala	Leu	Ala	Asp	Ala	Arg	Leu	Ala	Pro	Gly
			325					330					335		
Asp	Val	Asp	Val	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp
		340					345					350			
Pro	Ile	Glu	Ala	Gln	Ala	Leu	Ile	Ala	Thr	Tyr	Gly	Gln	Glu	Lys	Ser
	355					360					365				
Ser	Glu	Gln	Pro	Leu	Arg	Leu	Gly	Ala	Leu	Lys	Ser	Asn	Ile	Gly	His
370					375					380					
Thr	Gln	Ala	Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Gln	Ala
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Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu Pro Ser
            405                 410                 415
Asp Gln Ile Asp Trp Ser Ala Gly Thr Val Glu Leu Leu Thr Glu Ala
            420                 425                 430
Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala Ala Val
            435                 440                 445
Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu Glu Glu
        450                 455                 460
Ala Pro Ala Val Glu Asp Ser Pro Ala Val Glu Pro Pro Ala Gly Gly
465                 470                 475                 480
Gly Val Val Pro Trp Pro Val Ser Ala Lys Thr Pro Ala Ala Leu Asp
                485                 490                 495
Ala Gln Ile Gly Gln Leu Ala Ala Tyr Ala Asp Gly Arg Thr Asp Val
            500                 505                 510
Asp Pro Ala Val Ala Ala Arg Ala Leu Val Asp Ser Arg Thr Ala Met
        515                 520                 525
Glu His Arg Ala Val Ala Val Gly Asp Ser Arg Glu Ala Leu Arg Asp
        530                 535                 540
Ala Leu Arg Met Pro Glu Gly Leu Val Arg Gly Thr Ser Ser Asp Val
545                 550                 555                 560
Gly Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly
                565                 570                 575
Met Gly Ala Glu Leu Leu Asp Ser Ser Pro Glu Phe Ala Ala Ser Met
            580                 585                 590
Ala Glu Cys Glu Thr Ala Leu Ser Arg Tyr Val Asp Trp Ser Leu Glu
            595                 600                 605
Ala Val Val Arg Gln Glu Pro Gly Ala Pro Thr Leu Asp Arg Val Asp
        610                 615                 620
Val Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val
625                 630                 635                 640
Trp Gln His His Gly Ile Thr Pro Gln Ala Val Val Gly His Ser Gln
                645                 650                 655
Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu Asp Asp
            660                 665               ,   670
Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu
            675                 680                 685
Ala Gly Lys Gly Gly Met Ile Ser Leu Ala Leu Asp Glu Ala Ala Val
        690                 695                 700
Leu Lys Arg Leu Ser Asp Phe Asp Gly Leu Ser Val Ala Ala Val Asn
705                 710                 715                 720
Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Glu Glu
                725                 730                 735
Leu Ala Arg Thr Cys Glu Ala Asp Gly Val Arg Ala Arg Ile Ile Pro
            740   .               745                 750
Val Asp Tyr Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu Lys Glu
            755   ·               760                 765
Leu Ala Glu Val Leu Ala Gly Leu Ala Pro Gln Ala Pro His Val Pro
        770                 775                 780
Phe Phe Ser Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val Leu Asp
785                 790                 795                 800
Gly Thr Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro
                805                 810                 815
Ala Val Glu Thr Leu Ala Val Asp Gly Phe Thr His Phe Ile Glu Val
            820                 825                 830
Ser Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly
            835                 840                 845
Leu Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu Val Thr
        850                 855                 860
Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Ile Asp Trp Ala Pro
865                 870         .           875                 880
Ile Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr Tyr Ala
                885                 890                 895
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104

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Phe Gln Thr Glu Arg Phe Trp Leu Gln Ser Ser Ala Pro Thr Ser Ala
            900                     905             910
Ala Asp Asp Trp Arg Tyr Arg Val Glu Trp Lys Pro Leu Thr Ala Ser
            915                     920             925
Gly Gln Ala Asp Leu Ser Gly Arg Trp Ile Val Ala Val Gly Ser Glu
        930                 935             940
Pro Glu Ala Glu Leu Leu Gly Ala Leu Lys Ala Ala Gly Ala Glu Val
945                 950             955                     960
Asp Val Leu Glu Ala Gly Ala Asp Asp Asp Arg Glu Ala Leu Ala Ala
                965                 970             975
Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly Phe Thr Gly Val Val Ser
        980                 985             990
Leu Leu Asp Asp Leu Val Pro Gln Val Ala Trp Val Gln Ala Leu Gly
        995                 1000            1005
Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser Val Thr Gln Gly Ala Val
    1010                1015                1020
Ser Val Gly Arg Leu Asp Thr Pro Ala Asp Pro Asp Arg Ala Met Leu
1025                1030                1035                1040
Trp Gly Leu Gly Arg Val Val Ala Leu Glu His Pro Glu Arg Trp Ala
                1045                1050                1055
Gly Leu Val Asp Leu Pro Ala Gln Pro Asp Ala Ala Ala Leu Ala His
            1060                1065                1070
Leu Val Thr Ala Leu Ser Gly Ala Thr Gly Glu Asp Gln Ile Ala Ile
        1075                1080                1085
Arg Thr Thr Gly Leu His Ala Arg Arg Leu Ala Arg Ala Pro Leu His
        1090                1095                1100
Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro His Gly Thr Val Leu Ile
1105                1110                1115                1120
Thr Gly Gly Thr Gly Ala Leu Gly Ser His Ala Ala Arg Trp Met Ala
                1125                1130                1135
His His Gly Ala Glu His Leu Leu Leu Val Ser Arg Ser Gly Glu Gln
            1140                1145                1150
Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr Ala Ser Gly Ala
        1155                1160                1165
Arg Val Thr Ile Ala Ala Cys Asp Val Ala Asp Pro His Ala Met Arg
    1170                1175                1180
Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu Thr Ala Val Val
1185                1190                1195                1200
His Thr Ala Gly Ala Pro Gly Gly Asp Pro Leu Asp Val Thr Gly Pro
                1205                1210                1215
Glu Asp Ile Ala Arg Ile Leu Gly Ala Lys Thr Ser Gly Ala Glu Val
            1220                1225                1230
Leu Asp Asp Leu Leu Arg Gly Thr Pro Leu Asp Ala Phe Val Leu Tyr
        1235                1240                1245
Ser Ser Asn Ala Gly Val Trp Gly Ser Gly Ser Gln Gly Val Tyr Ala
    1250                1255                1260
Ala Ala Asn Ala His Leu Asp Ala Leu Ala Ala Arg Arg Arg Ala Arg
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Gly Glu Thr Ala Thr Ser Val Ala Trp Gly Leu Trp Ala Gly Asp Gly
                1285                1290                1295
Met Gly Arg Gly Ala Asp Asp Ala Tyr Trp Gln Arg Arg Gly Ile Arg
            1300                1305                1310
Pro Met Ser Pro Asp Arg Ala Leu Asp Glu Leu Ala Lys Ala Leu Ser
            1315                1320                1325
His Asp Glu Thr Phe Val Ala Val Ala Asp Val Asp Trp Glu Arg Phe
    1330                1335                1340
Ala Pro Ala Phe Thr Val Ser Arg Pro Ser Leu Leu Leu Asp Gly Val
1345                1350                1355                1360
Pro Glu Ala Arg Gln Ala Leu Ala Ala Pro Val Gly Ala Pro Ala Pro
            1365                1370                1375
Gly Asp Ala Ala Val Ala Pro Thr Gly Gln Ser Ser Ala Leu Ala Ala
            1380                1385                1390
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105

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Ile Thr Ala Leu Pro Glu Pro Glu Arg Arg Pro Ala Leu Leu Thr Leu
        1395                1400                1405
Val Arg Thr His Ala Ala Ala Val Leu Gly His Ser Ser Pro Asp Arg
        1410                1415                1420
Val Ala Pro Gly Arg Ala Phe Thr Glu Leu Gly Phe Asp Ser Leu Thr
1425                1430                1435                1440
Ala Val Gln Leu Arg Asn Gln Leu Ser Thr Val Val Gly Asn Arg Leu
                1445                1450                1455
Pro Ala Thr Thr Val Phe Asp His Pro Thr Pro Ala Ala Leu Ala Ala
                1460                1465                1470
His Leu His Glu Ala Tyr Leu Ala Pro Ala Glu Pro Ala Pro Thr Asp
        1475                1480                1485
Trp Glu Gly Arg Val Arg Arg Ala Leu Ala Glu Leu Pro Leu Asp Arg
        1490                1495                1500
Leu Arg Asp Ala Gly Val Leu Asp Thr Val Leu Arg Leu Thr Gly Ile
1505                1510                1515                1520
Glu Pro Glu Pro Gly Ser Gly Gly Ser Asp Gly Gly Ala Ala Asp Pro
                1525                1530                1535
Gly Ala Glu Pro Glu Ala Ser Ile Asp Asp Leu Asp Ala Glu Ala Leu
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Ile Arg Met Ala Leu Gly Pro Arg Asn Thr
        1555                1560
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<210> 36
<211> 4041
<212> DNA
<213> Streptomyces venezuelae

<400> 36
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gactggtctc tcgaagccgt cgtccgacag gctcccagcg caccgacact cgaccgcgtc    1860
gacgtcgtcc agcccgtcac cttcgccgtc atggtctccc tcgccaaggt ctggcagcac    1920
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                                106

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acccggcagc gcatcgagaa cctccacgga ctgtcgatcg ccgccgtcaa cgggcctacc      2160
gccaccgtgg tttcgggcga ccccacccag atccaagaac ttgctcaggc gtgtgaggcc      2220
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<210> 37
<211> 1346
<212> PRT
<213> Streptomyces venezuelae

<400> 37

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                20                  25                  30
Arg Gln Glu Pro Met Ala Ile Val Gly Met Ser Cys Arg Phe Ala Gly
            35                  40                  45
Gly Ile Arg Ser Pro Glu Asp Leu Trp Asp Ala Val Ala Ala Gly Lys
        50                  55                  60
Asp Leu Val Ser Glu Val Pro Glu Glu Arg Gly Trp Asp Ile Asp Ser
65                  70                  75                  80
Leu Tyr Asp Pro Val Pro Gly Arg Lys Gly Thr Thr Tyr Val Arg Asn
                85                  90                  95
Ala Ala Phe Leu Asp Asp Ala Ala Gly Phe Asp Ala Ala Phe Phe Gly
                100                 105                 110
Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Gln Leu
            115                 120                 125
Leu Glu Ala Ser Trp Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Ala
        130                 135                 140
Ser Val Arg Gly Thr Asp Val Gly Val Tyr Val Gly Cys Gly Tyr Gln
145                 150                 155                 160
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107

```
Asp Tyr Ala Pro Asp Ile Arg Val Ala Pro Glu Gly Thr Gly Gly Tyr
             165                 170                 175
Val Val Thr Gly Asn Ser Ser Ala Val Ala Ser Gly Arg Ile Ala Tyr
             180                 185                 190
Ser Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser
             195                 200                 205
Ser Ser Leu Val Ala Leu His Leu Ala Leu Lys Gly Leu Arg Asn Gly
    210                 215                 220
Asp Cys Ser Thr Ala Leu Val Gly Gly Val Ala Val Leu Ala Thr Pro
225                 230                 235                 240
Gly Ala Phe Ile Glu Phe Ser Ser Gln Gln Ala Met Ala Ala Asp Gly
                 245                 250                 255
Arg Thr Lys Gly Phe Ala Ser Ala Ala Asp Gly Leu Ala Trp Gly Glu
             260                 265                 270
Gly Val Ala Val Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Lys
             275                 280                 285
Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala Ile Asn Gln Asp
             290                 295                 300
Gly Ala Ser Asn Gly Leu Thr Ala Pro His Gly Pro Ser Gln Gln His
305                 310                 315                 320
Leu Ile Arg Gln Ala Leu Ala Asp Ala Arg Leu Thr Ser Ser Asp Val
                 325                 330                 335
Asp Val Val Glu Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile
             340                 345                 350
Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Gly Arg Ala Pro Gly
             355                 360                 365
Gln Pro Leu Arg Leu Gly Thr Leu Lys Ser Asn Ile Gly His Thr Gln
    370                 375                 380
Ala Ala Ser Gly Val Ala Gly Val Ile Lys Met Val Gln Ala Leu Arg
385                 390                 395                 400
His Gly Val Leu Pro Lys Thr Leu His Val Asp Glu Pro Thr Asp Gln
                 405                 410                 415
Val Asp Trp Ser Ala Gly Ser Val Glu Leu Leu Thr Glu Ala Val Asp
             420                 425                 430
Trp Pro Glu Arg Pro Gly Arg Leu Arg Arg Ala Gly Val Ser Ala Phe
             435                 440                 445
Gly Val Gly Gly Thr Asn Ala His Val Val Leu Glu Glu Ala Pro Ala
    450                 455                 460
Val Glu Glu Ser Pro Ala Val Glu Pro Pro Ala Gly Gly Gly Val Val
465                 470                 475                 480
Pro Trp Pro Val Ser Ala Lys Thr Ser Ala Ala Leu Asp Ala Gln Ile
                 485                 490                 495
Gly Gln Leu Ala Ala Tyr Ala Glu Asp Arg Thr Asp Val Asp Pro Ala
             500                 505                 510
Val Ala Ala Arg Ala Leu Val Asp Ser Arg Thr Ala Met Glu His Arg
             515                 520                 525
Ala Val Ala Val Gly Asp Ser Arg Glu Ala Leu Arg Asp Ala Leu Arg
    530                 535                 540
Met Pro Glu Gly Leu Val Arg Gly Thr Val Thr Asp Pro Gly Arg Val
545                 550                 555                 560
Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly Ala
                 565                 570                 575
Glu Leu Leu Asp Ser Ser Pro Glu Phe Ala Ala Ala Met Ala Glu Cys
             580                 585                 590
Glu Thr Ala Leu Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala Val Val
             595                 600                 605
Arg Gln Ala Pro Ser Ala Pro Thr Leu Asp Arg Val Asp Val Val Gln
    610                 615                 620
Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val Trp Gln His
625                 630                 635                 640
His Gly Ile Thr Pro Glu Ala Val Ile Gly His Ser Gln Gly Glu Ile
                 645                 650                 655
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108

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Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala Arg
            660                 665                 670
Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly Lys
            675                 680                 685
Gly Gly Met Ile Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg
            690                 695                 700
Ile Glu Asn Leu His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro Thr
705                 710                 715                 720
Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln
            725                 730                 735
Ala Cys Glu Ala Asp Gly Ile Arg Ala Arg Ile Ile Pro Val Asp Tyr
            740                 745                 750
Ala Ser His Ser Ala His Val Glu Thr Ile Glu Asn Glu Leu Ala Asp
            755                 760                 765
Val Leu Ala Gly Leu Ser Pro Gln Thr Pro Gln Val Pro Phe Phe Ser
            770                 775                 780
Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr
785                 790                 795                 800
Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala Val Glu
            805                 810                 815
Thr Leu Ala Thr Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser Ala
            820                 825                 830
His Pro Val Leu Thr Met Thr Leu Pro Asp Lys Val Thr Gly Leu Ala
            835                 840                 845
Thr Leu Arg Arg Glu Asp Gly Gly Gln His Arg Leu Thr Thr Ser Leu
            850                 855                 860
Ala Glu Ala Trp Ala Asn Gly Leu Ala Leu Asp Trp Ala Ser Leu Leu
865                 870                 875                 880
Pro Ala Thr Gly Ala Leu Ser Pro Ala Val Pro Asp Leu Pro Thr Tyr
            885                 890                 895
Ala Phe Gln His Arg Ser Tyr Trp Ile Ser Pro Ala Gly Pro Gly Glu
            900                 905                 910
Ala Pro Ala His Thr Ala Ser Gly Arg Glu Ala Val Ala Glu Thr Gly
            915                 920                 925
Leu Ala Trp Gly Pro Gly Ala Glu Asp Leu Asp Glu Glu Gly Arg Arg
            930                 935                 940
Ser Ala Val Leu Ala Met Val Met Arg Gln Ala Ala Ser Val Leu Arg
945                 950                 955                 960
Cys Asp Ser Pro Glu Glu Val Pro Val Asp Arg Pro Leu Arg Glu Ile
            965                 970                 975
Gly Phe Asp Ser Leu Thr Ala Val Asp Phe Arg Asn Arg Val Asn Arg
            980                 985                 990
Leu Thr Gly Leu Gln Leu Pro Pro Thr Val Val Phe Gln His Pro Thr
            995                 1000                1005
Pro Val Ala Leu Ala Glu Arg Ile Ser Asp Glu Leu Ala Glu Arg Asn
1010                1015                1020
Trp Ala Val Ala Glu Pro Ser Asp His Glu Gln Ala Glu Glu Glu Lys
1025                1030                1035                1040
Ala Ala Ala Pro Ala Gly Ala Arg Ser Gly Ala Asp Thr Gly Ala Gly
            1045                1050                1055
Ala Gly Met Phe Arg Ala Leu Phe Arg Gln Ala Val Glu Asp Asp Arg
            1060                1065                1070
Tyr Gly Glu Phe Leu Asp Val Leu Ala Glu Ala Ser Ala Phe Arg Pro
            1075                1080                1085
Gln Phe Ala Ser Pro Glu Ala Cys Ser Glu Arg Leu Asp Pro Val Leu
            1090                1095                1100
Leu Ala Gly Gly Pro Thr Asp Arg Ala Glu Gly Arg Ala Val Leu Val
1105                1110                1115                1120
Gly Cys Thr Gly Thr Ala Ala Asn Gly Gly Pro His Glu Phe Leu Arg
            1125                1130                1135
Leu Ser Thr Ser Phe Gln Glu Glu Arg Asp Phe Leu Ala Val Pro Leu
            1140                1145                1150
```

109

Pro Gly Tyr Gly Thr Gly Thr Gly Thr Gly Thr Ala Leu Leu Pro Ala
    1155   1160   1165
Asp Leu Asp Thr Ala Leu Asp Ala Gln Ala Arg Ala Ile Leu Arg Ala
    1170   1175   1180
Ala Gly Asp Ala Pro Val Val Leu Leu Gly His Ser Gly Gly Ala Leu
1185   1190   1195   1200
Leu Ala His Glu Leu Ala Phe Arg Leu Glu Arg Ala His Gly Ala Pro
            1205   1210   1215
Pro Ala Gly Ile Val Leu Val Asp Pro Tyr Pro Pro Gly His Gln Glu
            1220   1225   1230
Pro Ile Glu Val Trp Ser Arg Gln Leu Gly Glu Gly Leu Phe Ala Gly
            1235   1240   1245
Glu Leu Glu Pro Met Ser Asp Ala Arg Leu Leu Ala Met Gly Arg Tyr
            1250   1255   1260
Ala Arg Phe Leu Ala Gly Pro Arg Pro Gly Arg Ser Ser Ala Pro Val
1265   1270   1275   1280
Leu Leu Val Arg Ala Ser Glu Pro Leu Gly Asp Trp Gln Glu Glu Arg
            1285   1290   1295
Gly Asp Trp Arg Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val
            1300   1305   1310
Pro Gly Asp His Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala
            1315   1320   1325
Glu Ala Val Leu Ser Trp Leu Asp Ala Ile Glu Gly Ile Glu Gly Ala
    1330   1335   1340
Gly Lys
1345

<210> 38
<211> 1251
<212> DNA
<213> Streptomyces venezuelae

<400> 38
gtgcgccgta cccagcaggg aacgaccgct tctccccccgg tactcgacct cggggccctg   60
gggcaggatt tcgcggccga tccgtatccg acgtacgcga gactgcgtgc cgagggtccg   120
gcccaccggg tgcgcacccc cgaggggac gaggtgtggc tggtcgtcgg ctacgaccgg   180
gcgcggggcgg tcctcgccga tccccggttc agcaaggact ggcgcaactc cacgactccc   240
ctgaccgagg ccgaggccgc gctcaaccac aacatgctgg agtccgaccc gccgcggcac   300
acccggctgc gcaagctggt ggcccgtgag ttcaccatgc gccgggtcga gttgctgcgg   360
cccccgggtcc aggagatcgt cgacgggctc gtggacgcca tgctggcggc cccgacggc   420
cgcgccgatc tgatggagtc cctggcctgg ccgctgccga tcaccgtgat ctccgaactc   480
ctcggcgtgc ccgagccgga ccgcgccgcc ttccgcgtct ggaccgacgc cttcgtcttc   540
ccggacgatc ccgcccaggc ccagaccgcc atggccgaga tgagcggcta tctctccccgg   600
ctcatcgact ccaagcgcgg gcaggacggc gaggacctgc tcagcgcgct cgtgcggacc   660
agcgacgagg acggctcccg gctgacctcc gaggagctgc tcggtatggc ccacatcctg   720
ctcgtcgcgg ggcacgagac cacggtcaat ctgatcgcca acggcatgta cgcgctgctc   780
tcgcaccccg accagctggc cgccctgcgg gccgacatga cgctcttgga cggcgcggtg   840
gaggagatgt tgcgctacga gggcccggtg gaatccgcga cctaccgctt cccggtcgag   900
cccgtcgacc tggacggcac ggtcatcccg gccggtgaca cggtcctcgt cgtcctggcc   960
gacgcccacc gcaccccga gcgcttcccg gacccgcacc gcttcgacat ccgccgggac   1020
accgccggcc atctcgcctt cggccacggc atccacttct gcatcggcgc cccccttggcc   1080
cggttggagg cccggatcgc cgtccgcgcc cttctcgaac gctgcccgga cctcgccctg   1140
gacgtctccc ccggcgaact cgtgtggtat ccgaacccga tgattcgcgg gctcaaggcc   1200
ctgccgatcc gctggcggcg aggacgggag gcgggccgcc gtaccggttg a   1251

<210> 39
<211> 416
<212> PRT
<213> Streptomyces venezuelae

110

<400> 39
Met Arg Arg Thr Gln Gln Gly Thr Thr Ala Ser Pro Pro Val Leu Asp
1   5   10   15
Leu Gly Ala Leu Gly Gln Asp Phe Ala Ala Asp Pro Tyr Pro Thr Tyr
            20   25   30
Ala Arg Leu Arg Ala Glu Gly Pro Ala His Arg Val Arg Thr Pro Glu
        35   40   45
Gly Asp Glu Val Trp Leu Val Val Gly Tyr Asp Arg Ala Arg Ala Val
    50   55   60
Leu Ala Asp Pro Arg Phe Ser Lys Asp Trp Arg Asn Ser Thr Thr Pro
65   70   75   80
Leu Thr Glu Ala Glu Ala Ala Leu Asn His Asn Met Leu Glu Ser Asp
                85   90   95
Pro Pro Arg His Thr Arg Leu Arg Lys Leu Val Ala Arg Glu Phe Thr
                100   105   110
Met Arg Arg Val Glu Leu Leu Arg Pro Arg Val Gln Glu Ile Val Asp
        115   120   125
Gly Leu Val Asp Ala Met Leu Ala Ala Pro Asp Gly Arg Ala Asp Leu
    130   135   140
Met Glu Ser Leu Ala Trp Pro Leu Pro Ile Thr Val Ile Ser Glu Leu
145   150   155   160
Leu Gly Val Pro Glu Pro Asp Arg Ala Ala Phe Arg Val Trp Thr Asp
            165   170   175
Ala Phe Val Phe Pro Asp Asp Pro Ala Gln Ala Gln Thr Ala Met Ala
            180   185   190
Glu Met Ser Gly Tyr Leu Ser Arg Leu Ile Asp Ser Lys Arg Gly Gln
        195   200   205
Asp Gly Glu Asp Leu Leu Ser Ala Leu Val Arg Thr Ser Asp Glu Asp
    210   215   220
Gly Ser Arg Leu Thr Ser Glu Glu Leu Leu Gly Met Ala His Ile Leu
225   230   235   240
Leu Val Ala Gly His Glu Thr Thr Val Asn Leu Ile Ala Asn Gly Met
            245   250   255
Tyr Ala Leu Leu Ser His Pro Asp Gln Leu Ala Ala Leu Arg Ala Asp
        260   265   270
Met Thr Leu Leu Asp Gly Ala Val Glu Glu Met Leu Arg Tyr Glu Gly
    275   280   285
Pro Val Glu Ser Ala Thr Tyr Arg Phe Pro Val Glu Pro Val Asp Leu
    290   295   300
Asp Gly Thr Val Ile Pro Ala Gly Asp Thr Val Leu Val Val Leu Ala
305   310   315   320
Asp Ala His Arg Thr Pro Glu Arg Phe Pro Asp Pro His Arg Phe Asp
            325   330   335
Ile Arg Arg Asp Thr Ala Gly His Leu Ala Phe Gly His Gly Ile His
            340   345   350
Phe Cys Ile Gly Ala Pro Leu Ala Arg Leu Glu Ala Arg Ile Ala Val
        355   360   365
Arg Ala Leu Leu Glu Arg Cys Pro Asp Leu Ala Leu Asp Val Ser Pro
    370   375   380
Gly Glu Leu Val Trp Tyr Pro Asn Pro Met Ile Arg Gly Leu Lys Ala
385   390   395   400
Leu Pro Ile Arg Trp Arg Arg Gly Arg Glu Ala Gly Arg Arg Thr Gly
            405   410   415

<210> 40
<211> 2787
<212> DNA
<213> Streptomyces venezuelae

<400> 40
atgaatctgg tggaacgcga cggggagata gcccatctca gggccgttct tgacgcatcc   60
gccgcaggtg acgggacgct cttactcgtc tccggaccgg ccggcagcgg gaagacggag   120

111

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ctgctgcggt cgctccgccg gctggccgcc gagcgggaga cccccgtctg gtcggtccgg      180
gcgctgccgg gtgaccgcga catccccctg ggcgtcctct gccagttact ccgcagcgcc      240
gaacaacacg gtgccgacac ctccgccgtc cgcgacctgc tggacgccgc ctcgcggcgg      300
gccggaaacc tcacctcccc cgccgacgcg ccgctccgcg tcgacgagac acaccgcctg      360
cacgactggc tgctctccgt ctcccgccgc accccgttcc tcgtcgccgt cgacgacctg      420
acccacgccg acaccgcgtc cctgaggttc ctcctgtact cgccgcccca ccacgaccag      480
ggcggcatcg gcttcgtcat gaccgagcgg gcctcgcagc gcgccggata ccgggtgttc      540
cgcgccgagc tgctccgcca gccgcactgc cgcaacatgt ggctctccgg gcttcccccc      600
agcggggtac gccagttact cgcccactac tacggccccg aggccgccga gcggcgggcc      660
cccgcgtacc acgcgacgac cggcgggaac ccgctgctcc tgcgggcgct gacccaggac      720
cggcaggcct cccacaccac cctcggcgcg gccggcggcg acgagcccgt ccacggcgac      780
gccttcgccc aggccgtcct cgactgcctg caccgcagcg ccgagggcac actggagacc      840
gcccgctggc tcgcggtcct cgaacagtcc gacccgctcc tggtggagcg gctcacggga      900
acgaccgccg ccgccgtcga gcgccacatc caggagctcg ccgccatcgg cctcctggac      960
gaggacggca ccctgggaca gcccgcgatc cgcgaggccg ccctccagga cctgccggcc     1020
ggcgagcgca ccgaactgca ccggcgcgcc gcggagcagc tgcaccggga cggcgccgac     1080
gaggacaccg tggcccgcca cctgctggtc ggcggcgccc ccgacgctcc ctgggcgctg     1140
cccctgctcg aacgggggcgc gcagcaggcc ctgttcgacg accgactcga cgacgccttc     1200
cggatcctcg agttcgccgt gcggtcgagc accgacaaca cccagctggc ccgcctcgcc     1260
ccacacctgg tcgcggcctc ctggcggatg aacccgcaca tgacgacccg ggccctcgca     1320
ctcttcgacc ggctcctgag cggtgaactg ccgcccagcc acccggtcat ggccctgatc     1380
cgctgcctcg tctggtacgg gcggctgccc gaggccgccg acgcgctgtc ccggctgcgg     1440
cccagctccg acaacgatgc cttggagctg tcgctcaccc ggatgtggct cgcggcgctg     1500
tgcccgccgc tcctggagtc cctgccggcc acgccggagc cggagcgggg tcccgtcccc     1560
gtacggctcg cgccgcggac gaccgcgctc caggcccagg ccggcgtctt ccagcggggc     1620
ccggacaacg cctcggtcgc gcaggccgaa cagatcctgc agggctgccg gctgtcggag     1680
gagacgtacg aggccctgga cacggccctc ttggtcctcg tccacgccga ccggctcgac     1740
cgggcgctgt tctggtcgga cgccctgctc gccgaggccg tggagcggcg gtcgctcggc     1800
tgggaggcgg tcttcgccgc gacccggggcg atgatcgcga tccgctgcgg cgacctcccg     1860
acggcgcggg agcgggccga gctggcgctc tcccacgcgg cgccggagag ctggggcctc     1920
gccgtgggca tgcccctctc cgcgctgctg ctcgcctgca cggaggccgg cgagtacgaa     1980
caggcggagc gggtcctgcg gcagccggtg ccggacgcga tgttcgactc gcggcacggc·    2040
atggagtaca tgcacgcccg gggccgctac tggctggcga cgggccggct gcacgcggcg     2100
ctgggcgagt tcatgctctg cggggagatc ctgggcagct ggaacctcga ccagccctcg     2160
atcgtgccct ggcggacctc cgccgccgag gtgtacctgc ggctcggcaa ccgccagaag     2220
gccagggcgc tggccgaggc ccagctcgcc ctggtgcggc ccgggcgctc ccgcacccgg     2280
ggtctcaccc tgcgggtcct ggcggcggcg gtggacggcc agcaggcgga gcggctgcac     2340
gccgaggcgg tcgacatgct gcacgacagc ggcgaccggc tcgaacacgc ccgcgcgctc     2400
gccgggatga gccgccacca gcaggcccag ggggacaact accgggcgag gatgacggcg     2460
cggctcgccg gcgacatggc gtgggcctgc ggcgcgtacc cgctggccga ggagatcgtg     2520
ccgggccgcg gcggccgccg ggcgaaggcg gtgagcacgg agctggaact gccgggcggc     2580
ccggacgtcg gcctgctctc ggaggccgaa cgccgggtgg cggccctggc agcccgagga     2640
ttgacgaacc gccagatagc gcgccggctc tgcgtcaccg cgagcacggt cgaacagcac     2700
ctgacgcgcg tctaccgcaa actgaacgtg acccgccgag cagacctccc gatcagcctc     2760
gcccaggaca agtccgtcac ggcctga                                        2787
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<210> 41
<211> 928
<212> PRT
<213> Streptomyces venezuelae

<400> 41
Met Asn Leu Val Glu Arg Asp Gly Glu Ile Ala His Leu Arg Ala Val
1   5   10   15
Leu Asp Ala Ser Ala Ala Gly Asp Gly Thr Leu Leu Leu Val Ser Gly
            20   25   30
Pro Ala Gly Ser Gly Lys Thr Glu Leu Leu Arg Ser Leu Arg Arg Leu
        35   40   45
Ala Ala Glu Arg Glu Thr Pro Val Trp Ser Val Arg Ala Leu Pro Gly
    50   55   60
Asp Arg Asp Ile Pro Leu Gly Val Leu Cys Gln Leu Leu Arg Ser Ala
65   70   75   80

112

```
Glu Gln His Gly Ala Asp Thr Ser Ala Val Arg Asp Leu Leu Asp Ala
                85                  90                  95
Ala Ser Arg Arg Ala Gly Asn Leu Thr Ser Pro Ala Asp Ala Pro Leu
               100                 105                 110
Arg Val Asp Glu Thr His Arg Leu His Asp Trp Leu Leu Ser Val Ser
               115                 120                 125
Arg Arg Thr Pro Phe Leu Val Ala Val Asp Asp Leu Thr His Ala Asp
       130                 135                 140
Thr Ala Ser Leu Arg Phe Leu Leu Tyr Cys Ala Ala His His Asp Gln
145                 150                 155                 160
Gly Gly Ile Gly Phe Val Met Thr Glu Arg Ala Ser Gln Arg Ala Gly
               165                 170                 175
Tyr Arg Val Phe Arg Ala Glu Leu Leu Arg Gln Pro His Cys Arg Asn
               180                 185                 190
Met Trp Leu Ser Gly Leu Pro Pro Ser Gly Val Arg Gln Leu Leu Ala
               195                 200                 205
His Tyr Tyr Gly Pro Glu Ala Ala Glu Arg Arg Ala Pro Ala Tyr His
       210                 215                 220
Ala Thr Thr Gly Gly Asn Pro Leu Leu Leu Arg Ala Leu Thr Gln Asp
225                 230                 235                 240
Arg Gln Ala Ser His Thr Thr Leu Gly Ala Ala Gly Gly Asp Glu Pro
               245                 250                 255
Val His Gly Asp Ala Phe Ala Gln Ala Val Leu Asp Cys Leu His Arg
               260                 265                 270
Ser Ala Glu Gly Thr Leu Glu Thr Ala Arg Trp Leu Ala Val Leu Glu
       275                 280                 285
Gln Ser Asp Pro Leu Leu Val Glu Arg Leu Thr Gly Thr Thr Ala Ala
       290                 295                 300
Ala Val Glu Arg His Ile Gln Glu Leu Ala Ala Ile Gly Leu Leu Asp
305                 310                 315                 320
Glu Asp Gly Thr Leu Gly Gln Pro Ala Ile Arg Glu Ala Ala Leu Gln
               325                 330                 335
Asp Leu Pro Ala Gly Glu Arg Thr Glu Leu His Arg Arg Ala Ala Glu
               340                 345                 350
Gln Leu His Arg Asp Gly Ala Asp Glu Asp Thr Val Ala Arg His Leu
       355                 360                 365
Leu Val Gly Gly Ala Pro Asp Ala Pro Trp Ala Leu Pro Leu Leu Glu
       370                 375                 380
Arg Gly Ala Gln Gln Ala Leu Phe Asp Asp Arg Leu Asp Asp Ala Phe
385                 390                 395                 400
Arg Ile Leu Glu Phe Ala Val Arg Ser Ser Thr Asp Asn Thr Gln Leu
               405                 410                 415
Ala Arg Leu Ala Pro His Leu Val Ala Ala Ser Trp Arg Met Asn Pro
               420                 425                 430
His Met Thr Thr Arg Ala Leu Ala Leu Phe Asp Arg Leu Leu Ser Gly
       435                 440                 445
Glu Leu Pro Pro Ser His Pro Val Met Ala Leu Ile Arg Cys Leu Val
450                 455                 460
Trp Tyr Gly Arg Leu Pro Glu Ala Ala Asp Ala Leu Ser Arg Leu Arg
465                 470                 475                 480
Pro Ser Ser Asp Asn Asp Ala Leu Glu Leu Ser Leu Thr Arg Met Trp
               485                 490                 495
Leu Ala Ala Leu Cys Pro Pro Leu Leu Glu Ser Leu Pro Ala Thr Pro
               500                 505                 510
Glu Pro Glu Arg Gly Pro Val Pro Val Arg Leu Ala Pro Arg Thr Thr
               515                 520                 525
Ala Leu Gln Ala Gln Ala Gly Val Phe Gln Arg Gly Pro Asp Asn Ala
       530                 535                 540
Ser Val Ala Gln Ala Glu Gln Ile Leu Gln Gly Cys Arg Leu Ser Glu
545                 550                 555                 560
Glu Thr Tyr Glu Ala Leu Glu Thr Ala Leu Leu Val Leu Val His Ala
               565                 570                 575
```

113

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Asp Arg Leu Asp Arg Ala Leu Phe Trp Ser Asp Ala Leu Leu Ala Glu
            580                 585                 590
Ala Val Glu Arg Arg Ser Leu Gly Trp Glu Ala Val Phe Ala Ala Thr
            595                 600                 605
Arg Ala Met Ile Ala Ile Arg Cys Gly Asp Leu Pro Thr Ala Arg Glu
        610             615             620
Arg Ala Glu Leu Ala Leu Ser His Ala Ala Pro Glu Ser Trp Gly Leu
625             630             635             640
Ala Val Gly Met Pro Leu Ser Ala Leu Leu Leu Ala Cys Thr Glu Ala
                645             650             655
Gly Glu Tyr Glu Gln Ala Glu Arg Val Leu Arg Gln Pro Val Pro Asp
            660             665             670
Ala Met Phe Asp Ser Arg His Gly Met Glu Tyr Met His Ala Arg Gly
            675             680             685
Arg Tyr Trp Leu Ala Thr Gly Arg Leu His Ala Ala Leu Gly Glu Phe
            690             695             700
Met Leu Cys Gly Glu Ile Leu Gly Ser Trp Asn Leu Asp Gln Pro Ser
705             710             715             720
Ile Val Pro Trp Arg Thr Ser Ala Ala Glu Val Tyr Leu Arg Leu Gly
                725             730             735
Asn Arg Gln Lys Ala Arg Ala Leu Ala Glu Ala Gln Leu Ala Leu Val
            740             745             750
Arg Pro Gly Arg Ser Arg Thr Arg Gly Leu Thr Leu Arg Val Leu Ala
            755             760             765
Ala Ala Val Asp Gly Gln Gln Ala Glu Arg Leu His Ala Glu Ala Val
    770             775             780
Asp Met Leu His Asp Ser Gly Asp Arg Leu Glu His Ala Arg Ala Leu
785             790             795             800
Ala Gly Met Ser Arg His Gln Gln Ala Gln Gly Asp Asn Tyr Arg Ala
            805             810             815
Arg Met Thr Ala Arg Leu Ala Gly Asp Met Ala Trp Ala Cys Gly Ala
            820             825             830
Tyr Pro Leu Ala Glu Glu Ile Val Pro Gly Arg Gly Gly Arg Arg Ala
            835             840             845
Lys Ala Val Ser Thr Glu Leu Glu Leu Pro Gly Gly Pro Asp Val Gly
    850             855             860
Leu Leu Ser Glu Ala Glu Arg Arg Val Ala Ala Leu Ala Ala Arg Gly
865             870             875             880
Leu Thr Asn Arg Gln Ile Ala Arg Arg Leu Cys Val Thr Ala Ser Thr
            885             890             895
Val Glu Gln His Leu Thr Arg Val Tyr Arg Lys Leu Asn Val Thr Arg
            900             905             910
Arg Ala Asp Leu Pro Ile Ser Leu Ala Gln Asp Lys Ser Val Thr Ala
    915             920             925
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<210> 42
<211> 27
<212> DNA
<213> Streptomyces venezuelae

<400> 42
cccgaattcg ccgccgccat ggccgaa   27

<210> 43
<211> 35
<212> DNA
<213> Streptomyces venezuelae

<400> 43
gtgatgcatc ggctcggcga cggcccagtt ccgct   35

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<210> 44
<211> 45
<212> DNA
<213> Streptomyces venezuelae

<400> 44
atgcatcacc accaccacca ctgaggggc gggcaagtga ccgac                    45

<210> 45
<211> 33
<212> DNA
<213> Streptomyces venezuelae

<400> 45
gggtctagag ctgcaccggc gggtcgtagc gga                                33

<210> 46
<211> 27
<212> DNA
<213> Streptomyces venezuelae

<400> 46
gaattcatcg aggggcggg caagtga                                        27

<210> 47
<211> 31
<212> DNA
<213> Streptomyces venezuelae

<400> 47
atgcatcagg tcgtcggtca ccgtgggttc t                                  31

<210> 48
<211> 30
<212> DNA
<213> Streptomyces venezuelae

<400> 48
ggatccgcgc cgggatgttc cgcgccctgt                                    30

<210> 49
<211> 31
<212> DNA
<213> Streptomyces venezuelae

<400> 49
aaaatgcatc agaggtctgt cggtcacttg c                                  31

<210> 50
<211> 41
<212> DNA
<213> Streptomyces venezuelae

<400> 50
aaaagatctt gatggtgcag gcgctgcgcc acggggtgct g                       41

<210> 51
<211> 32
<212> DNA
<213> Streptomyces venezuelae
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<400> 51
aaaagatctc caacgaacag ttggtggacg ct   32

<210> 52
<211> 846
<212> DNA
<213> Streptomyces venezuelae

<400> 52
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gtgaccgaca gacctctgaa cgtggacagc ggactgtgga tccggcgctt ccaccccgcg      60
ccgaacagcg cggtgcggct ggtctgcctg ccgcacgccg gcggctccgc cagctacttc     120
ttccgcttct cggaggagct gcacccctcc gtcgaggccc tgtcggtgca gtatccgggc     180
cgccaggacc ggcgtgccga gccgtgtctg gagagcgtcg aggagctcgc cgagcatgtg     240
gtcgcggcca ccgaaccctg gtggcaggag ggccggctgg ccttcttcgg gcacagcctc     300
ggcgcctccg tcgccttcga gacggcccgc atcctggaac agcggcacgg ggtacggccc     360
gagggcctgt acgtctccgg tcggcgcgcc ccgtcgctgg cgccggaccg gctcgtccac     420
cagctggacg accgggcgtt cctggccgag atccggcggc tcagcggcac cgacgagcgg     480
ttcctccagg acgacgagct gctgcggctg gtgctgcccg cgctgcgcag cgactacaag     540
gcggcggaga cgtacctgca ccggccgtcc gccaagctca cctgcccggt gatggccctg     600
gccggcgacc gtgacccgaa ggcgccgctg aacgaggtgg ccgagtggcg tcggcacacc     660
agcgggccgt tctgcctccg ggcgtactcc ggcggccact ctacctcaa cgaccagtgg     720
cacgagatct gcaacgacat ctccgaccac ctgctcgtca cccgcggcgc gcccgatgcc     780
cgcgtcgtgc agcccccgac cagccttatc gaaggagcgg cgaagagatg cagaaccca     840
cggtga                                                              846
```

<210> 53
<211> 281
<212> PRT
<213> Streptomyces venezuelae

<400> 53
```
Met Thr Asp Arg Pro Leu Asn Val Asp Ser Gly Leu Trp Ile Arg Arg
 1               5                  10                  15
Phe His Pro Ala Pro Asn Ser Ala Val Arg Leu Val Cys Leu Pro His
            20                  25                  30
Ala Gly Gly Ser Ala Ser Tyr Phe Phe Arg Phe Ser Glu Glu Leu His
        35                  40                  45
Pro Ser Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg Gln Asp Arg
    50                  55                  60
Arg Ala Glu Pro Cys Leu Glu Ser Val Glu Glu Leu Ala Glu His Val
65                  70                  75                  80
Val Ala Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu Ala Phe Phe
                85                  90                  95
Gly His Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala Arg Ile Leu
            100                 105                 110
Glu Gln Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val Ser Gly Arg
            115                 120                 125
Arg Ala Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln Leu Asp Asp
    130                 135                 140
Arg Ala Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr Asp Glu Arg
145                 150                 155                 160
Phe Leu Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro Ala Leu Arg
                165                 170                 175
Ser Asp Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro Ser Ala Lys
            180                 185                 190
Leu Thr Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp Pro Lys Ala
            195                 200                 205
Pro Leu Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser Gly Pro Phe
    210                 215                 220
Cys Leu Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp
225                 230                 235                 240
```

116

```
His Glu Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly
                245                 250                 255
Ala Pro Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu Ile Glu Gly
            260                 265                 270
Ala Ala Lys Arg Trp Gln Asn Pro Arg    .
        275                 280
```

<210> 54
<211> 404
<212> DNA
<213> Streptomyces venezuelae

<400> 54
```
tggccgaagt gcccctcgac cggctgcggg acgccggggt cctcgacacc gtcctgcggc    60
tcaccggaat cgagcccgag ccggtgtccg gcggcccggc cgacggcgcc gcggaccccg   120
gtgcggagcc ggagccggag acgtcgatcg acgacctcga cgccgaggcc ctgatccgga   180
tggctctcgg cccgcggaac acctgacccg accgcggcca cggcccgcac accgccaggt   240
gccgtcaggc accacccgca cccctgcccc ccacacgccc acaaccccat ccacgagcgg   300
aagaccacac ccagatgacg agttccaacg agcagttggt ggacgctctg cgcgcctccc   360
tcaaggagaa cgaagaactc cggaaagaga gccgtcgccg ggac                    404
```

<210> 55
<211> 437
<212> DNA
<213> Streptomyces narbonensis

<400> 55
```
tggccgaact gcccctcgac cggctgcggg acgccggggt cctcgacacc gtcctgcgac    60
tcaccggcat cgagcccgag ccggtgcccg gcggcccggg cagcgtcgcc gccggccccg   120
ccgcggatcc ggaaccggag acgtcgatcg acgacctcga cgccgaggcc ctgatccgga   180
tggctctcgg cccgcggaac gcctgagcac ccgccccggc ccgtggctgc ccggcccctt   240
gcccgactgc gggccgggcc cgggcccgc acaccgccac gtaccacccc gcaccaccgc    300
ccccccacg cccacaacgc catccacgag cggaagacca cacccagatg acgagttcca    360
acgagcagtt ggtggacgct ctgcgcgcct ccctcaagga gaacgaagaa ctccggaaag   420
agagccgtcg ccgggac                                                 437
```

<210> 56
<211> 327
<212> DNA
<213> Streptomyces venezuelae

<400> 56
```
tcgacggcat cgagcgggac accgccgcgg accggcggac cgcgcagggg gcgaaccagt    60
gaccgacagc gttctgaacg tggacggcaa cctgtggatc cggcgcttcc atccctcgcc   120
gaacagcgcg gtgcgactgg tctgcctgcc ccatgccggc ggctccgcca gctacttctt   180
ccgcttctcg gaggagctcc acccctcggt cgaggccctg tcggtgcagt accccgggccg   240
ccaggaccgg cgtgccgagc cgtgcctgga gagcgtcgag gagctggccg agcacgtggt   300
cgcggccacc gaaccctggt ggcagga                                      327
```

<210> 57
<211> 327
<212> DNA
<213> Streptomyces narbonensis

<400> 57
```
tcgacggcat cgagcgggac accgccgccg ggcggcggac cgcgcagggg gcggaccagt    60
gaccgacaga gttctgaacg tggacagcag cctgtggatc cgacgcttcc acccctcgcc   120
gaacagcgcg gtgcggctgg tctgtctgcc gcacgccggt ggttccgcca gctacttctt   180
ccgcttctcg gaggagctcc acccctcggt cgaggccttg tcggtgcagt accccggccg    240
ccaggaccgg cgtgccgagc cgtgtctgga gaacgtcgag gagctcgccg agcacgtggt   300
cgcggccacc gaagcctggt ggcggga                                      327
```

117

<210> 58
<211> 25
<212> PRT
<213> A. eutrophus

<400> 58
Met Ala Thr Gly Lys Gly Ala Ala Ala Ser Thr Gln Glu Gly Lys Ser
 1   5   10   15
Gln Pro Phe Lys Val Thr Pro Gly Pro
            20   25

<210> 59
<211> 19
<212> PRT
<213> A. eutrophus

<400> 59
Ala Ala Ala Ser Thr Gln Glu Gly Lys Ser Gln Pro Phe Lys Val Thr
 1   5   10   15
Pro Gly Pro

<210> 60
<211> 16
<212> PRT
<213> A. eutrophus

<400> 60
Ser Thr Gln Glu Gly Lys Ser Gln Pro Phe Lys Val Thr Pro Gly Pro
 1   5   10   15

<210> 61
<211> 585
<212> PRT
<213> Streptomyces venezuelae

<400> 61
Met Ile Leu Arg Ala Gly Thr Ala Asp Pro Ala Pro Tyr Glu Glu Glu
 1   5   10   15
Ile Pro Gly Tyr Arg Ala Arg Ile Leu Asn Met Ser Asn Lys Asn Asn
                20   25   30
Asp Glu Leu Gln Arg Gln Ala Ser Glu Asn Thr Leu Gly Leu Asn Pro
            35   40   45
Val Ile Gly Ile Arg Arg Lys Asp Leu Leu Ser Ser Ala Arg Thr Val
    50   55   60
Leu Arg Gln Ala Val Arg Gln Pro Leu His Ser Ala Lys His Val Ala
65   70   75   80
His Phe Gly Leu Glu Leu Lys Asn Val Leu Leu Gly Lys Ser Ser Leu
                85   90   95
Ala Pro Glu Ser Asp Asp Arg Arg Phe Asn Asp Pro Ala Trp Ser Asn
            100   105   110
Asn Pro Leu Tyr Arg Arg Tyr Leu Gln Thr Tyr Leu Ala Trp Arg Lys
            115   120   125
Glu Leu Gln Asp Trp Ile Gly Asn Ser Asp Leu Ser Pro Gln Asp Ile
    130   135   140
Ser Arg Gly Gln Phe Val Ile Asn Leu Met Thr Glu Ala Met Ala Pro
145   150   155   160
Thr Asn Thr Leu Ser Asn Pro Ala Ala Val Lys Arg Phe Phe Glu Thr
                165   170   175
Gly Gly Lys Ser Leu Leu Asp Gly Leu Ser Asn Leu Ala Lys Asp Leu
                180   185   190

118

```
Val Asn Asn Gly Gly Met Pro Ser Gln Val Asn Met Asp Ala Phe Glu
        195                 200                 205
Val Gly Lys Asn Leu Gly Thr Ser Glu Gly Ala Val Val Tyr Arg Asn
        210                 215                 220
Asp Val Leu Glu Leu Ile Gln Tyr Lys Pro Ile Thr Glu Gln Val His
225                     230                 235                 240
Ala Arg Pro Leu Leu Val Val Pro Pro Gln Ile Asn Lys Phe Tyr Val
                245                 250                 255
Phe Asp Leu Ser Pro Glu Lys Ser Leu Ala Arg Tyr Cys Leu Arg Ser
                260                 265                 270
Gln Gln Gln Thr Phe Ile Ile Ser Trp Arg Asn Pro Thr Lys Ala Gln
        275                 280                 285
Arg Glu Trp Gly Leu Ser Thr Tyr Ile Asp Ala Leu Lys Glu Ala Val
        290                 295                 300
Asp Ala Val Leu Ala Ile Thr Gly Ser Lys Asp Leu Asn Met Leu Gly
305                     310                 315                 320
Ala Cys Ser Gly Gly Ile Thr Cys Thr Ala Leu Val Gly His Tyr Ala
                325                 330                 335
Ala Leu Gly Glu Asn Lys Val Asn Ala Leu Thr Leu Leu Val Ser Val
                340                 345                 350
Leu Asp Thr Thr Met Asp Asn Gln Val Ala Leu Phe Val Asp Glu Gln
        355                 360                 365
Thr Leu Glu Ala Ala Lys Arg His Ser Tyr Gln Ala Gly Val Leu Glu
        370                 375                 380
Gly Ser Glu Met Ala Lys Val Phe Ala Trp Met Arg Pro Asn Asp Leu
385                     390                 395                 400
Ile Trp Asn Tyr Trp Val Asn Asn Tyr Leu Leu Gly Asn Glu Pro Pro
                405                 410                 415
Val Phe Asp Ile Leu Phe Trp Asn Asn Asp Thr Thr Arg Leu Pro Ala
                420                 425                 430
Ala Phe His Gly Asp Leu Ile Glu Met Phe Lys Ser Asn Pro Leu Thr
        435                 440                 445
Arg Pro Asp Ala Leu Glu Val Cys Gly Thr Pro Ile Asp Leu Lys Gln
        450                 455                 460
Val Lys Cys Asp Ile Tyr Ser Leu Ala Gly Thr Asn Asp His Ile Thr
465                     470                 475                 480
Pro Trp Gln Ser Cys Tyr Arg Ser Ala His Leu Phe Gly Gly Lys Ile
                485                 490                 495
Glu Phe Val Leu Ser Asn Ser Gly His Ile Gln Ser Ile Leu Asn Pro
                500                 505                 510
Pro Gly Asn Pro Lys Ala Arg Phe Met Thr Gly Ala Asp Arg Pro Gly
        515                 520                 525
Asp Pro Val Ala Trp Gln Glu Asn Ala Thr Lys His Ala Asp Ser Trp
        530                 535                 540
Trp Leu His Trp Gln Ser Trp Leu Gly Glu Arg Ala Gly Glu Leu Glu
545                     550                 555                 560
Lys Ala Pro Thr Arg Leu Gly Asn Arg Ala Tyr Ala Ala Gly Glu Ala
                565                 570                 575
Ser Pro Gly Thr Tyr Val His Glu Arg
                580                 585

<210> 62
<211> 268
<212> PRT
<213> Streptomyces venezuelae

<400> 62
Ile Arg Arg Phe His Pro Ala Pro Asn Ser Ala Val Arg Leu Val Cys
 1               5                   10                  15
Leu Pro His Ala Gly Gly Ser Ala Ser Tyr Phe Phe Arg Phe Ser Glu
                20                  25                  30
```

119

```
Glu Leu His Pro Ser Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg
        35              40              45
Gln Asp Arg Arg Ala Glu Pro Cys Leu Glu Ser Val Glu Glu Leu Ala
        50              55              60
Glu His Val Val Ala Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu
65              70              75                      80
Ala Phe Phe Gly His Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala
                85              90              95
Arg Ile Leu Glu Gln Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val
        100             105             110
Ser Gly Arg Arg Ala Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln
        115             120             125
Leu Asp Asp Arg Ala Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr
        130             135             140
Asp Glu Arg Phe Leu Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro
145             150             155             160
Ala Leu Arg Ser Asp Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro
                165             170             175
Ser Ala Lys Leu Thr Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp
        180             185             190
Pro Lys Ala Pro Leu Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser
        195             200             205
Gly Pro Phe Cys Leu Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn
        210             215             220
Asp Gln Trp His Glu Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val
225             230             235             240
Thr Arg Gly Ala Pro Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu
                245             250             255
Ile Glu Gly Ala Ala Lys Arg Trp Gln Asn Pro Arg
        260             265
```

120